BROOKLYN BOTANIC GARDEN RECORD

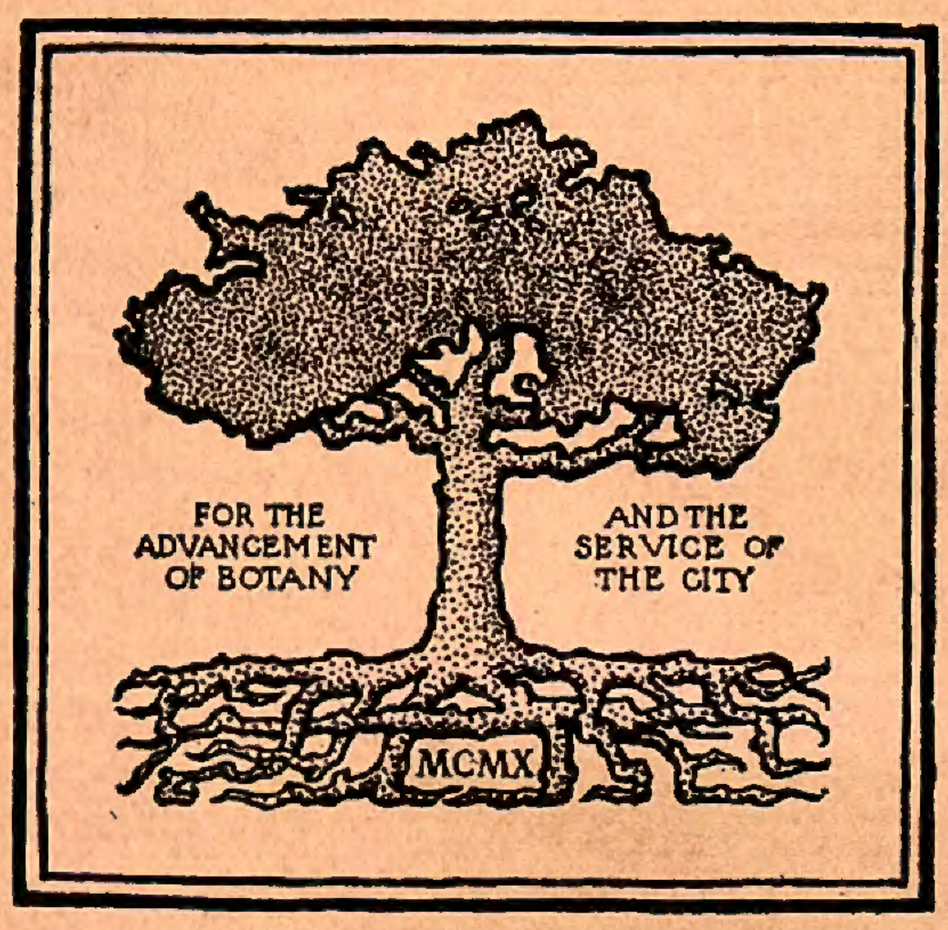
VOL. XXVI JANUARY, 1937 NO. 1

CONTENTS

DELECTUS SEMINUM

BROOKLYN

1936



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* Resigned, November 1, 1936.

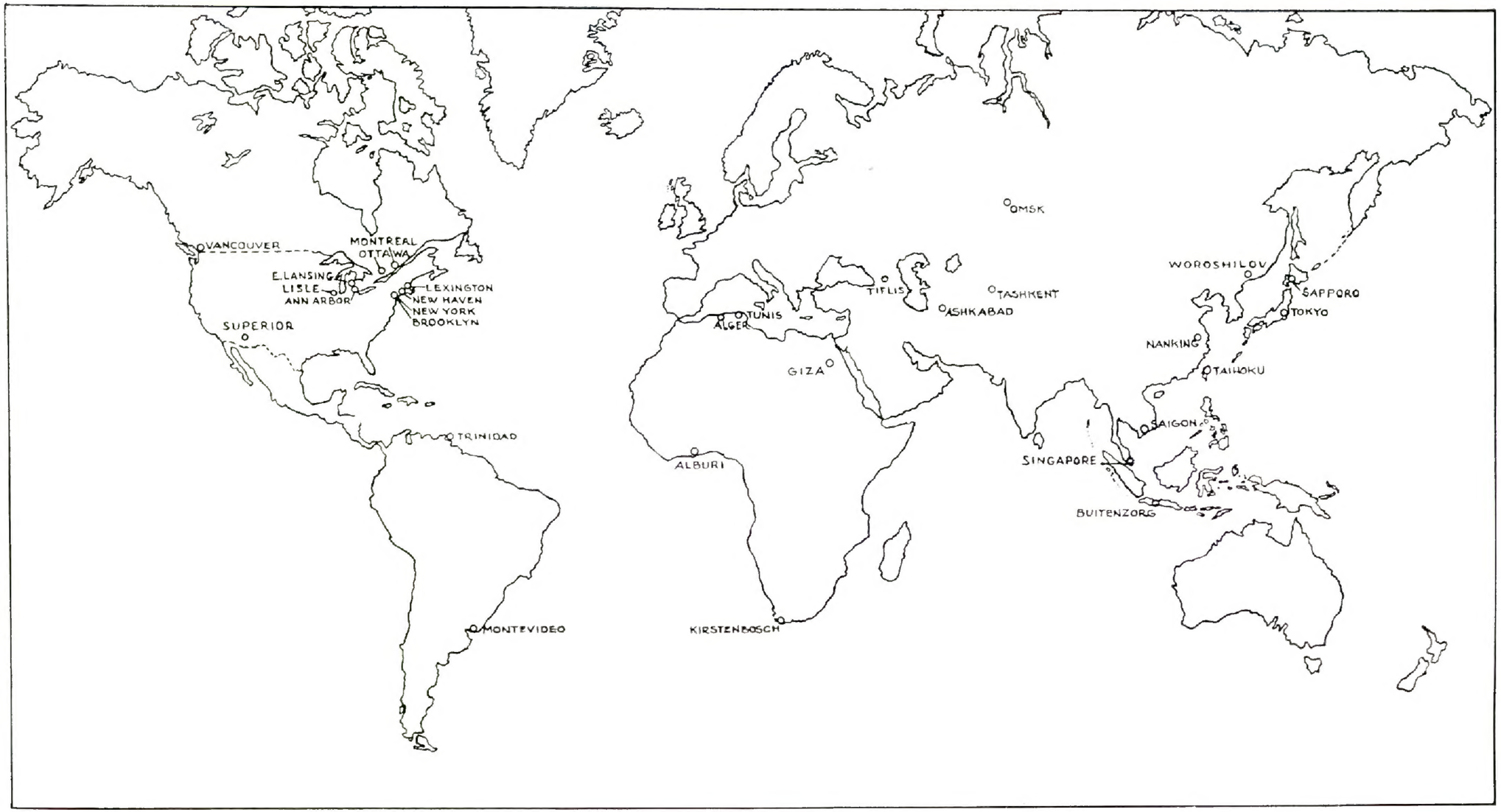

FIG. 1. Map of the world, showing, as of November, 1936, the location of botanic gardens outside of Europe from which the Brooklyn Botanic Garden has received seed-exchange lists in recent years. A similar map for Europe was published in Brooklyn Botanic Garden RECORD, January, 1935 (*Delectus Seminum, Brooklyn, 1934*).

BROOKLYN
BOTANIC GARDEN
RECORD

VOL. XXVI JANUARY, 1937 NO. 1

DELECTUS SEMINUM, BROOKLYN 1936

List of Seeds Offered in Exchange

These seeds, collected during 1936, are offered to botanic gardens and to other regular correspondents; also, in limited quantities, to members of the Brooklyn Botanic Garden. They are not offered for sale.

Please note that applications for seeds must be received during January or February. Seeds are mailed early in March. No seeds are available at other times of the year.

SEEDS OF TREES AND SHRUBS

Gymnospermae

Ginkgoaceae 4

Ginkgo
biloba L.

Taxaceae 5

Taxus
canadensis Marsh.
cuspidata Sieb. & Zucc.

Pinaceae 6

Abies
balsamea Mill.

Cupressaceae 6

Juniperus
communis L. var. depressa Pursh

DICOTYLEDONES

Aceraceae 163

Acer
gimnala Maxim.

Anacardiaceae 153

Rhus
sylvestris Sieb. & Zucc.
vernix L.

Aquifoliaceae 157

Ilex
glabra Gray
verticillata (L.) Gray
Nemopanthus
mucronata Trel.

Araliaceae 227

Acanthopanax
divaricatus Seem.
Henryi Harms
Aralia
spinosa L.

Berberidaceae 93

Berberis
amurensis Rupr.
canadensis Mill.

Betulaceae 61

Betula
corylifolia Reg.
glandulosa Michx.
japonica var. mandshurica Winkl.

Bignoniaceae 258

Campsis
radicans Seem.

Cactaceae 210

Opuntia
tortispina Engelm.

Calycanthaceae 96

Calycanthus
floridus L.

Caprifoliaceae 271

Kolkwitzia
amabilis Graebn.
Lonicera
Ferdinandi Franch.
Maackii Maxim.
Morrowii A. Gray
muscaviensis Rehd.
quinquelocularis Hardw.
syringantha Maxim.
tatarica L.
Webbiana Wall.
xylosteum L.
Sambucus
canadensis L.
canadensis var. acutiloba Ellw. & Barry
racemosa L.
Symphoricarpus
albus (L.) Blake (S. racemosus Michx.)
occidentalis Hook.
orbiculatus Moench.
Viburnum
acerifolium L.
alnifolium Marsh.
cassinoides L.
dentatum L.
dilatatum Thunb.
Lantana L.
Lentago L.
lobophyllum Graebn.
molle Michx.
Opulus L.
prunifolium L.
pubescens var. affine Rehd.
rufidulum Raf.
scabrellum Chapm.
theiferum Rehd.

Celastraceae 158

Evonymus
americana L.
Bungeana Maxim.
patens Rehd.

Clethraceae 230

Clethra
alnifolia L.

Cornaceae 229

Cornus
alba L.
alternifolia L.
Amomum Mill.
canadensis L.
florida L.
florida var. xanthocarpa Rehd.
gracilis Koehne
kousa Buerg.
mas L.
paucinervis Hance
sanguinea L.
stolonifera Michx.

Dilleniaceae 180

Actinidia
arguta Miq.

Ebenaceae 240

Diospyros
virginiana L.

Ericaceae 233

Gaultheria
procumbens L.
Kalmia
polifolia Wangenh.
Oxydendron
arboreum DC.

Ericaceae

Vaccinoideae 233a

Vaccinium
atrococcum Heller
canadense Kalm
pennsylvanicum Lam.

Euphorbiaceae 147

Securinega
ramiflora Muell.

Grossulariaceae 117b

Ribes
fasciculatum Sieb. & Zucc.
var. chinense Maxim.

Guttiferae 187

Hypericum
Androsaemum L.
densiflorum Pursh

Leguminosae 128

Amorpha
canescens Nutt.
fruticosa L.
glabra Poir.
microphylla Pursh
Caragana
arborescens Lam.
microphylla Bess.
Colutea
media Willd. (C. arborescens × orientalis)
Cladrastis
lutea K. Koch
Cytisus
nigricans L.
scoparius Lk.
supinus L.
Gleditsia
triacanthos L.
Gymnocladus
dioeca K. Koch
Indigofera
Gerardiana Wall.
Potaninii Craib
Laburnum
anagyroides Med.

Robinia
fertilis Ashe
Kelseyi hybrid
neo-mexicana Gray
Pseudoacacia L.
Sophora
japonica L.

Leitneriaceae 59

Leitneria
floridana Chapm.

Moraceae 64

Maclura
pomifera Schneid.

Myricaceae 57

Myrica
caroliniensis Mill.
Gale L.

Oleaceae 243

Fontanesia
Fortunei Carr.
Ligustrum
acuminatum Koehne var. macrocarpum Schn.
ibolium Coe
ibota Sieb. & Zucc.
Syringa
Josikaea Jacq.
pekinensis Rupr.
villosa Vahl

Platanaceae 124

Platanus
orientalis L. (true)

Pyrolaceae 231

Chimaphila
umbellata Nutt.

Ranunculaceae 91

Clematis
tangutica Korsh.
virginiana L.

Rhamnaceae 169

Rhamnus
davurica Pall.
Frangula L.

Rosaceae 126

Physocarpus
intermedius Schneid.
opulifolius Maxim.
Rosa
carolina L.
multiflora cathayensis Rehd.
rugosa Thunb.
Rubus
odoratus L.
phoenicolasius Maxim.
Sorbaria
Aitchisonii Hemsl.
sorbifolia A. Br.
Spiraea
bumalda Burvenich
Douglasii Hook.
latifolia Borkh.
sorbifolia A.
superba Zabel
syringaeflora Lemoine
tomentosa L.

Rosaceae

Pomoideae 126a

Aronia
melanocarpa Elliott
Chaenomeles
Maulei Schneid.
Cotoneaster
divaricata Rehd. & Wils.
hupehensis Rehd. & Wils.
integerrima Med.
lucida Schlecht
nitens Rehd. & Wils.
racemiflora K. Koch
Zabeli Schneid.
Crataegus
arnoldiana Sarg.
Lavallei Herincq.
pedicellata Sarg.

Malus
baccata Borkh.
floribunda Sieb.
Scheideckeri Zabel
Sieboldii Rehd.
toringoides Hughes
Mespilus
germanica L.
Photinia
villosa DC.
Pyrus
betulifolia Bge.
Calleryana Decne.
ussuriensis Maxim.
Sorbus
americana Marsh.
Aucuparia L.
hybrida L.

Rosaceae

Prunoideae 126b

Prunus
cerasifera Ehrh.
glandulosa Thunb.
maritima Marsh.
Padus L.
pennsylvanica L.
serotina Ehrh.
utahensis Dieck.
virginiana L.

Rubiaceae 270

Cephalanthus
occidentalis L.

Rutaceae 137

Evodia
hupehensis Dode
Phellodendron
chinense Schneid.
japonicum Thunb.
Lavallei Dode
Poncirus
trifoliata Raf.
Ptelea
trifoliata L.
Zanthoxylum
americanum Mill.
Bungei Planch.

Sapindaceae 165

Koelreuteria
paniculata Laxm.

Saxifragaceae 117

Hydrangea
Bretschneideri Dipp.
cinerea Small
paniculata Sieb.
Itea
virginica L.

Solanaceae 253

Lycium
barbarum L.

Staphyleaceae 161

Staphylea
bumalda DC.
colchica Stev.
colchica coulombieri Zabel
pinnata L.

Styracaceae 242

Halesia
carolina L.

Tamaricaceae 191

Tamarix
odessana Stev.
pentandra Pall.

Theaceae 186

Gordonia
altamaha Sarg.

Tiliaceae 174

Grewia
parviflora Bge.

Ulmaceae 63

Celtis
occidentalis L.

Verbenaceae 253

Callicarpa
japonica Thunb.
Clerodendron
trichotomum Thunb.

Vitaceae 170

Ampelopsis
brevipedunculata Koehne
Parthenocissus
quinquefolia Planch.

MONOCOTYLEDONES

Liliaceae 338

Smilax
rotundifolia L.

SEEDS OF HERBACEOUS PLANTS

Collected at Belgrade Lakes, Maine

By Dr. C. Stuart Gager

Aralia
hispida Vent.
nudicaulis L.
Arisaema
triphyllum (L.) Schott
Clintonia
borealis (Ait.) Raf.
Coptis
trifolia (L.) Salisb.
Maianthemum
canadense Desf.
Medeola
virginiana L.
Mitchella
repens L.
Oakesia
sessilifolia (L.) Wats.
Polygonatum
biflorum (Walt.) Ell.
Pyrola
elliptica Nutt.
Scirpus
atrocinctus Fernald
Smilacina
racemosa (L.) Desf.
Thalictrum
polygamum Muhl.
Trillium
undulatum Willd.

SEEDS OF ORNAMENTAL PLANTS

Chiefly for members of the Brooklyn Botanic Garden

Ageratum
Houstonianum
Anoda (Blue Hibiscus)
lavateroides
Antirrhinum (Snapdragon)
majus (Mixed Varieties)
Arctotis (African Daisy)
stoechadifolia
Celosia (Cockscomb)
argentea var. cristata
Euphorbia
marginata (Snow-on-the-Mountain)
Gaillardia
aristata

Gomphrena
globosa (Globe Amaranth)
Helichrysum (Strawflower)
bracteatum
Hibiscus
trionum (Flower-of-an-Hour)
Kochia (Summer Cypress)
scoparia var. trichophila
Mimulus (Monkey-Flower)
luteus
Perilla
frutescens var. nankinensis
Phlox
Drummondi
Portulaca
grandiflora
Scabiosa (Sweet Scabious)
atropurpurea
Stokesia (Stokes Aster)
laevis
Torenia
Fournieri
Verbena
venosa

Address requests for seeds before February 28 to

SEED EXCHANGE,
Brooklyn Botanic Garden,
1000 Washington Avenue,
Brooklyn, N. Y.,
U. S. A.

INTERNATIONAL SEED EXCHANGE

Botanical Institutions Outside of Europe from Which We Have Received Seed Lists

Canada

Montreal Botanical Garden,
4101 East Sherbrooke Street,
Montreal (1936)

Central Experimental Farm Arboretum,
Ottawa

Department of Botany,
University of British Columbia,
Vancouver, B. C.

United States

Lexington Gardens, Inc.,
91 Hancock Street,
Lexington, Mass.

Marsh Botanical Garden,
227 Mansfield Street,
New Haven, Connecticut

New York Botanical Garden,
Bronx Park, New York

Brooklyn Botanic Garden,
Brooklyn, New York

Botanic Gardens,
University of Michigan,
Ann Arbor, Michigan

Morton Arboretum,
Lisle, Illinois

Boyce Thompson Southwestern Arboretum,
Superior, Arizona

South America

Royal Botanic Garden, Agric. Dept.,
Trinidad & Tobago,
British West Indies

Jardin Museo Botanico,
Direccion de Paseos Publicos,
Montevideo (Prado),
Uruguay

Africa

Jardin Botanique de l'Université,
Alger (Algeria)

Chief du Service Botanique a l'Ariana,
Tunis (Tunisie)

Ministry of Agriculture,
Horticultural Section,
Giza (Mudiriya), Egypt

Botanic Gardens,
Aburi,
Gold Coast Colony

National Botanic Gardens,
Kirstenbosch, Niewland,
Cape, South Africa

Asiatic U. S. S. R.

Omsk Institutum Agriculturae,
Hortus Botanicus,
Omsk, Siberia

Jardin Botanique,
Tiflis (Georgia)

Jardin Botanique,
Ashkhabad, Turcomania

Institutum Botanicum,
Universitatis Asiae Mediae,
Tashkent, Tadshikistan

Woroshilov, D. V. K. s. Kondratenkovo,
Gorno-Taieshnaya Stantia,
D. V. Filiala Akademii Nauk
Botanicheski Kabinet

JAPAN

Botanic Gardens,
Imperial University,
Koishikawa,
Tokyo

Botanic Garden, College of Agriculture,
Hokkaido Imperial University,
Sapporo

Department of Botany,
Faculty of Science,
Hokkaido Imperial University,
Sapporo

Botanic Garden of Taihoku University,
Taihoku, Formosa

TROPICAL ASIA

Botanic Garden, Singapore,
Federated Malay States

Jardin Botanique,
Saigon, Cochin-China

's Lands Plantentuin,
Buitenzorg,
Java, Dutch East Indies

We would appreciate corrections or information about additional institutions publishing seed lists.

We regret receiving no seed lists from extensive and important regions indicated by vacancies on the accompany map (Frontispiece).

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GENERAL INFORMATION

MEMBERSHIP.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, N. Y.* Telephone, Prospect 9–6173.

THE BOTANIC GARDEN is open free to the public daily from 8 a.m. until dusk; on Sundays and Holidays it is open at 10 a.m.

ENTRANCES.—On Flatbush Avenue, near Empire Boulevard and near Mt. Prospect Reservoir; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Crown Street.

TO ASSIST MEMBERS and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden;* to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one day in advance. No parties of less than six adults will be conducted.

TO REACH THE GARDEN take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, or Tompkins Avenue trolley to Washington Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street or Vanderbilt Avenue trolley to Prospect Park Plaza and Union Street. BY AUTOMOBILE from points on Long Island take Eastern Parkway west and turn left at Washington Avenue; from Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway, turn left following Parkway to Washington Avenue; then turn right.

* Deceased, November 5, 1936.

BROOKLYN BOTANIC GARDEN
PUBLICATIONS

RECORD. Established, January, 1912. An administrative periodical issued quarterly (1912–1928); bimonthly (1929–1932); quarterly (1933–). Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, announcements of courses of instruction, seed list, guides, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden. To others $1.00 a year. Circulates in 59 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Circulates in 47 countries.

Volume I. *Dedication Papers:* comprising 33 scientific papers presented at the dedication of the laboratory building and plant houses, April 19–21, 1917. 521 pages. Price $3.50, plus postage.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk: A study of grassland and forest. By Norman Taylor, June 11, 1923. 108 pages. Price $1.00, plus postage.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor, June 10, 1927. 151 pages. Price $1.60.

CONTRIBUTIONS. Established, April 1, 1911. Papers originally published in periodicals, reissued as "separates" without change of paging, and numbered consecutively. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume. Circulates in 34 countries.

No. 70. Inheritance of resistance to loose smut in hybrids of Fulghum and Black Mesdag oats. 10 pages. 1935.

No. 71. Physiologic specialization of the parasitic fungi. 19 pages. 1935.

No. 73. Studies of the root nodule organisms of certain wild legumes. 19 pages. 1936.

No. 74. The effects of radium rays on plants: Résumé of the more important papers from 1901 to 1932. 27 pages. 1936.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. The purpose of the *Leaflets* is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication. Issued as numbers of the RECORD; see above.

Guide No. 5. The Rock Garden. 28 illustrations. Price, 35 cents. By mail, 40 cents.

Guide No. 6. Japanese potted trees (Hachinoki). 11 illustrations. Price, 35 cents. By mail, 40 cents.

Guide No. 7. The story of our boulders: Glacial geology of the Brooklyn Botanic Garden. 22 illustrations. Price, 35 cents. By mail, 40 cents.

Guide No. 8. The story of fossil plants. 8 illustrations. Price, 35 cents. By mail, 40 cents.

SEED LIST. (*Delectus Seminum*) Established, December, 1914. Since 1925 issued each year in the January number of the RECORD. Circulation includes 160 botanic gardens and institutions located in 40 countries.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $4.00 a year. Circulates in 48 countries.

GENETICS. Established, January, 1916. Bimonthly. Subscription, $6.00 a year. Circulates in 37 countries.

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXVI APRIL, 1937 NO. 2

CONTAINING THE

TWENTY-SIXTH ANNUAL REPORT

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THE BOTANIC GARDEN AND THE CITY

THE BROOKLYN BOTANIC GARDEN, established in 1910, is a Department of the Brooklyn Institute of Arts and Sciences. It is supported in part by municipal appropriations, and in part by private funds, including income from endowment, membership dues, and special contributions. Its articulation with the City is through the Department of Parks.

The City owns the land devoted to Garden purposes, builds, lights, and heats the buildings, and keeps them in repair, and includes in its annual tax budget an appropriation for other items of maintenance. One third of the cost of the present buildings (about $300,000) and of other permanent improvements (about $253,000) has been met from private funds.

Appointments to all positions are made by the director of the Garden, with the approval of the Botanic Garden Governing Committee, and all authorized expenditures for maintenance are made in the name of the private organization, from funds advanced by the Institute, which, in turn, is reimbursed from time to time by the City, within the limits, and according to the terms of the annual Tax Budget appropriation.

All plants have been purchased with private funds since the Garden was established. In addition to this, it has been the practice of the Garden, from its beginning, to purchase all books for the library, all specimens for the herbarium, all lantern slides and photographic material, and numerous other items, and to pay certain salaries, with private funds.

The needs of the Garden for private funds for all purposes, are more than twice as great as the present income from endowment, membership dues, and special contributions. The director of the Garden will be glad to give full information as to possible uses of such funds to any who may be interested.

INFORMATION CONCERNING MEMBERSHIP

The Brooklyn Institute of Arts and Sciences is organized in three main departments: 1. The Department of Education. 2. The Museums. 3. The Botanic Garden.

Any of the following seven classes of membership may be taken out through the Botanic Garden:

1.	Annual member	$ 10
2.	Sustaining member	25
3.	Life member	500
4.	Permanent member	2,500
5.	Donor	10,000
6.	Patron	25,000
7.	Benefactor	100,000

Sustaining members are annual members with full privileges in Departments one to three. Membership in classes two to seven carries full privileges in Departments one to three.

In addition to opportunities afforded to members of the Botanic Garden for public service through cooperating in its development, and helping to further its aims to advance and diffuse a knowledge and love of plants, to help preserve our native wild flowers, and to afford additional and much needed educational advantages in Brooklyn and Greater New York, members may also enjoy the privileges indicated on the following page.

Further information concerning membership may be had by addressing The Director, Brooklyn Botanic Garden, Brooklyn, N. Y., or by personal conference by appointment. Telephone, Prospect 9–6173.

PRIVILEGES OF MEMBERSHIP

1. Free admission to the buildings and grounds at all times.
2. Cards of admission for self and friends to all exhibitions and openings preceding the admission of the general public, and to receptions.
3. Services of docent (by appointment), for self and party (of not less than six), when visiting the Garden.
4. Admission of member and one guest to field trips and other scientific meetings under Garden auspices, at the Garden or elsewhere.
5. Free tuition in most courses of instruction; in other courses a liberal discount from the fee charged to non-members.
6. Invitations for self and friends to spring and fall "Flower Days," and to the Annual Spring Inspection.
7. Copies of Garden publications, as follows:
   a. RECORD (including the ANNUAL REPORT).
   b. GUIDES (to the Plantations and Collections).
   c. LEAFLETS (of popular information).
   d. CONTRIBUTIONS (on request. Technical papers).
8. Announcement Cards (Post Card Bulletins) concerning plants in flower and other items of interest.
9. Privileges of the Library and of the Herbarium.
10. Expert advice on the choice and care of ornamental trees, shrubs, and herbaceous plants, indoors and out; on planting the home grounds; the care of lawns; and the treatment of plants affected by insect and fungous pests.
11. Determination of botanical specimens.
12. Participation in the periodical distribution of surplus plant material and seeds, in accordance with special announcements sent to members from time to time.
13. Membership privileges in other botanic gardens and museums outside of Greater New York, when visiting other cities, and on presentation of membership card in Brooklyn Botanic Garden. (See the following page.)

FORMS OF BEQUEST TO THE BROOKLYN BOTANIC GARDEN

Form of Bequest for General Purposes

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which said sum to be used for the educational and scientific work of the Brooklyn Botanic Garden.

Form of Bequest for a Curatorship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, as an endowment for a curatorship in the Brooklyn Botanic Garden, the income from which sum to be used each year towards the payment of the salary of a curator in said Botanic Garden, to be known as the (here may be inserted the name of the donor or other person) curatorship.

Form of Bequest for a Fellowship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which sum to be used in the payment of a fellowship for advanced botanical investigation in the Brooklyn Botanic Garden, to be known as the .....fellowship.

Form of Bequest for other particular purposes designated by the testator

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, to be used (or the income from which to be used) for the Brooklyn Botanic Garden *

.....

.....

* The following additional purposes are suggested for which endowment is needed:

1. Botanical research.
2. Publishing the results of botanical investigations.
3. Popular botanical publication.
4. The endowment of a lectureship, or a lecture course.
5. Botanical illustrations for publications and lectures.
6. The purchase and collecting of plants.
7. The beautifying of the grounds.
8. The purchase of publications for the library.
9. Extending and enriching our work of public education.
10. The establishing of prizes to be awarded by the Brooklyn Botanic Garden for botanical research, or for superior excellence of botanical work in the High Schools of the City of New York.

OUT–OF–TOWN MEMBERSHIP PRIVILEGES

In accordance with a cooperative arrangement with a number of other institutions and organizations, Brooklyn Botanic Garden members, when visiting other cities, may, on presentation of their Botanic Garden membership card at the office of the cooperating museum or organization, be accorded, without charge, the same privileges as are enjoyed by the members of that institution, including admission to exhibits and lectures, and invitation to social events. This does not include being enrolled on the mailing list for publications, and does not include free admission to the Philadelphia and Boston spring Flower Shows.

In reciprocation, the members of the cooperating units, when visiting the Metropolitan district of Greater New York, will be accorded full membership privileges at the Brooklyn Botanic Garden.

The cooperating units are as follows:

Academy of Natural Sciences, Philadelphia, Pa.
Berkshire Museum, Springfield, Mass.
Boston Society of Natural History, Boston, Mass.
Buffalo Museum of Science, Buffalo, N. Y.
California Academy of Sciences, San Francisco.
Carnegie Museum, Pittsburgh, Pa.
Charleston Museum, Charleston, S. C.
Everhart Museum of Natural History, Science and Art, Scranton, Pa.
Fairbanks Museum of Natural Science, St. Johnsbury, Vt.
Field Museum of Natural History, Chicago, Ill.
Los Angeles Museum, Los Angeles, Calif.
Massachusetts Horticultural Society, Boston, Mass.
Missouri Botanical Garden, St. Louis, Mo.
Newark Museum, Newark, N. J.
New York State Museum, Albany, N. Y.
Peabody Museum of Archaeology and Ethnology, Cambridge, Mass.
Pennsylvania Horticultural Society, Philadelphia, Pa.
Philadelphia Commercial Museum, Philadelphia, Pa.
Southwest Museum, Los Angeles, California.

FIG. 1. Laboratory Plaza. Inner hedges of *Euonymus alata* var. *compacta;* outer hedge, Privet. View from the roof of the Laboratory Building, November 4. (9264)

BROOKLYN BOTANIC GARDEN RECORD

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TWENTY-SIXTH ANNUAL REPORT OF THE BROOKLYN BOTANIC GARDEN 1936

REPORT OF THE DIRECTOR

To the Botanic Garden Governing Committee:

I have the honor to present herewith the Twenty-Sixth Annual Report of the Brooklyn Botanic Garden for the calendar year 1936.

"Suppose that, instead of reading the page, we held the bound volume to our ear and it spoke to us." This unusual suggestion was made by the late John Jay Chapman in one of his books. To the writers of annual reports such a possibility appeals with peculiar force. But such a terrifying advantage is not available to them. They must still take for granted a certain initial interest, and must endeavor to sustain it throughout the silent pages.

In preparing the annual reports of the Brooklyn Botanic Garden it has always been an inspiration to know that the group of trustees to whom they are primarily addressed, and also the members of the Woman's Auxiliary and other members and supporters of the Garden, have this initial interest. It has also been a perennial hope that the reports might be the means of extending and deepening this interest. This hope has indeed been often realized.

The Plantations

"As Paradise (though of God's own planting) had not been Paradise longer than man was put into it; so, nor will our Gardens . . . remain long in their perfection, unless they are also continually cultivated. . . . We dare hardly pronounce it: there is not amongst men a more laborious life than is that of a good Gard'ners . . . but a labor full of tranquility and satisfaction. . . . A Gard'ners work is never at an end: It begins with the Year and continues to the next: He prepares the Ground, and then he Sows it; after that he Plants; and then he gathers the Fruits; but in all the intermedial spaces he is careful to dress it . . . and how intolerable a confusion will succeed a small neglect." The quotation is from the *Sylva* of John Evelyn, the diarist, the first book ordered printed by the Royal Society (1663 or 1664).

There has been abundant editorial and other comment on the excellent state of up-keep of our plantations (our "garden"). This is due in large measure to the faithful and efficient services of our small force of gardeners and the per diem men, several of whom have been with us for a number of years, and all of whom have identified their own interests with those of the Botanic Garden.

But the gardening and maintenance forces are both quite inadequate to meet the present needs. Each year, for a decade or so, more and more of the Garden's area has been brought under intensive cultivation. In succession the Laboratory and Conservatory Plazas with herbaceous borders, the Local Flora Section of some two acres, the Rose Garden of about one acre, the Horticultural Section of three acres have been laid out and intensively planted. The Rose Garden requires all the time of two gardeners; the new Horticultural Section should have the constant attention of two gardeners; the Local Flora Section needs the full time of one gardener with generous assistance according to season; and the Laboratory and Conservatory Plazas should have the undivided attention of one gardener. It is anticipated that the Garden of Medicinal and Culinary Plants will be planted in 1937. No trained gardener has been added to our force since all of these areas have been developed. Not only are gardeners needed for the gardening operations, but also for guard duty, and especially

to give horticultural information in answer to the questions which are continually being asked by the visiting public. The Garden needs at least six more trained gardeners to enable us to enrich the content of the special gardens, to maintain them (and the Conservatories) at higher standards of perfection, and to serve the public more effectively.

Attendance

General Attendance.—No special effort has ever been put forth for the express purpose of increasing the outdoor attendance, but as the Garden has become more beautiful and more educationally effective the attendance has tended to increase each year, with the fluctuations, of course, which all such institutions experience, owing to the vagaries of the weather and other causes. In 1936 it reached the impressive total of 1,567,304 persons as indicated by the registering turnstiles at the gates. This is really not the full total, for many persons enter the Garden through the Laboratory Building or elsewhere, without being counted. Especial attention is called to the week-end attendance of 34,019 on May 16–18, and of 37,871 on May 9–11. The appended report of the curator of public instruction gives further data on attendance.

The Rose Arc

Our Rose Garden was first opened to the public in 1928, as a gift from Mr. and Mrs. Walter V. Cranford. The passing of Mr. Cranford in December, 1935, was recorded in the 1935 report. In January, 1936, the director received a letter from Mrs. Cranford suggesting that she would like to do something further for the Botanic Garden as a memorial to Mr. Cranford. For some time it has been our hope that we could begin the horticultural development of the Esplanade. In the spring of 1936 we also received offers of gifts of roses in greater variety and quantity than could be accommodated in the Rose Garden. Our landscape architect, Mr. Caparn, had prepared a sketch, in color, for the treatment of the semi-circular south end of the Esplanade substantially as an extension of the Rose Garden.

The design includes a semi-circular water basin 58 feet wide, including coping, with a fountain as a central motif, surrounded

FIG. 2. Double queue entering at Richard Young Gate. Sunday, May 10. The two lines continued for two hours. (9323)

by a series of 27 arches for climbing roses and beds for the shrubs, and a ground cover of Clytemnestra roses between the curved edge of the water basin and the paved walk. This design appealed to Mrs. Cranford as satisfactory for the purpose she had in mind, and the director was authorized to proceed with the work at a cost not to exceed $5200.

The design, with bronze fountain, was approved by the Art Commission of the City on June 9, 1936. The contract for constructing the water basin and the steel arches was awarded to the lowest bidder, John Thatcher and Son. Work was begun on June 8, 1936 and completed on July 2.

The water basin is of reinforced concrete, with a coping of Indiana limestone. The depth of the water is six inches at the north edge and ten inches at the south edge. Extending below the general level of the bottom are four built-in concrete basins, twelve inches deep, for soil for water lilies.

There are stone bases for plant tubs at the two north corners of the basin.

The fountain is a beautiful bronze piece, "The Call of the Sea," by Harriet Frishmuth, purchased from the Grand Central Art Galleries. It is about four feet high above the water level, and represents a young girl riding on the back of a large fish, holding on with one hand, and with the other raised in exultation. It is altogether a very beautiful piece. (See front cover page of this Report.)

The roses, planted in the spring, included 100 "Mrs. F. D. Roosevelt," given by Charles A. and John H. Traendley, of Brooklyn; 100 "Carrie Jacobs Bond" and 100 Little Beauty, given by Henry A. Dreer, Inc., Riverton, New Jersey.

The Rose Garden

During the month of June (as in 1935) the Rose Garden was kept open to the public until 8 p.m., to enable those to enjoy it who are unable to come during regular working hours. The Rose Garden is not open to the public except when a guard or gardener can be in attendance.

A view in the Rose Garden, including the Overlook, was reproduced in color in the June issue of the *Ladies Home Journal,* thus

coming to the attention of its two and one-half million subscribers. By an error the illustration was credited elsewhere.

The Japanese Garden

Mr. Tsuyoshi Tamura, in his delightful book, *Art of the Landscape Garden in Japan*,[1] after noting that the Japanese people, "when in a poetic or artistic mood . . . sit quietly, and contemplate the mystic presence of the universe," tells us that "the garden of such a people could not have been other than what it is. The Japanese Garden is, therefore, primarily to look at. There are, no doubt, some exceptions to this in some of the larger gardens, but in its ordinary purpose, it was never thought of as a pleasant place for rambling and exercise. It is to be looked at for enjoyment in the same way as the *kakemono* (scroll painting) in the *tokonoma*" (drawing-room alcove).

"Love of nature is one of the outstanding racial characteristics of the Japanese. . . . Rather than to enjoy with open-air sports the invigorating power of Nature, our way is to sit quietly indoors and meditate on its eternal presence. . . . It is then but natural that this mental habit of a people contemplating Nature while sitting quietly indoors should also have been expressed in our garden art and have caused its singularly picturesque development."

The sharp contrast between the Japanese and the American conception of a garden is almost daily illustrated in the Brooklyn Botanic Garden. For us a garden is, above all else, a place to go into. Americans and other occidentals always want to go into our Japanese Garden—to walk and sit and have their pictures taken in it—to eat lunches there, in fact, if they were allowed. The Garden is kept closed in early spring, so that Japanese gardeners may do the necessary work without constant interruption and annoyance from over-curious visitors, and so that the unpaved walks and trails may thoroughly dry out before being walked on. During this short "closed season" the garden is a beautiful picture to look at from without, and the presence of the Japanese gardener adds a bit of delightful Japanese "color." Our American friends are impatient to get inside, where they really cannot

[1] Published by The Society for International Cultural Relations (Kokusai Bunka Shinokai). Tokyo, 1935.

see the Garden as a whole—as a miniature landscape. But Japanese visitors, on the contrary, who are present almost daily, may be seen enjoying the Garden by viewing it with contentment and appreciation from across the lake.

Our Japanese Garden still remains almost, if not quite, unique as the only Japanese Garden in a public park east of the Rocky Mountains. The endowment of this Garden affords an inviting opportunity to an individual or an organization wishing to promote an interest in Japanese culture and art in America. There is needed a permanent fund that would yield not less than $3500 a year for curatorial oversight, the salary of a guard and gardener (one person), the temporary services of a trained Japanese gardener, and the annual replacements and improvements.

Local Flora Section

Improvements in this section, and its scientific and educational significance are noted in the appended report of the curator of the herbarium, who is in charge. A number of large pieces of limestone rock have been needed for several years to give the proper soil condition for calciphile plants which cannot otherwise be successfully grown. The rock should be of such size and character that it can be placed on the slope (reserved for this feature) in a way to simulate a natural outcrop.

Horticultural Section

The foundational planting of this section has developed well during 1936—its first full year.

The Wall Garden has already become a feature of public interest, and the lawn is well established. This Section greatly needs the " furnishings " which have been designed for the north and south ends, including a fountain, seats, and ornamental columns. The design for the south end is reproduced in Fig. 4.

Medicinal and Culinary Plant Garden

Plans for this garden were reported in my preceding Annual Report. The labor for grading and other work in preparing the site, made available in the WPA project approved for the Brooklyn

Botanic Garden, was continued through a part of 1935 and for a few weeks in the spring of 1936, and then the men were transferred to another project. An Advisory Committee for the Medicinal Plants and one for Culinary Plants have been organized.

Conservatories

The Economic House of the Conservatories was first opened to the public on May 13, 1914, with an inspection by members of the New York Association of Biology Teachers and their friends. This house is 104 feet long, 44 feet wide, and 36 feet high to the top of the lantern above ground level. It was built by the Pierson U-Bar Co., not now in existence. Owing to the fact that it was built upon recently filled land, and partly to defect in design, this house began early to sag, and in a few months it had settled four inches. In December, 1914, the defect was remedied and the superstructure strengthened by four upright supports of steel tubes.

Apparently, gradual settling continued, and on March 13, 1936, we submitted to the Board of Estimate and Apportionment a request for a supplementary appropriation for Repairs and Replacements of $1800, the amount estimated by Hitchings and Company as sufficient to cover the necessary repairs. Subsequent inspection by engineers of the Park Department led to the conclusion that more work and materials would be required than was originally thought and a more thorough method adopted. We are indebted to the Park Department for their cooperation in making the necessary inspection, preparing the plans and specifications, and making application for a supplementary appropriation of $4200 to provide the total of $6000 required. This appropriation was voted by the Board of Estimate and Apportionment. Bids were opened on December 31, 1936, and the contract awarded to the Balaban-Gordon Company of New York, the lowest bidder. Work will begin in January, and the contract time is 80 working days.

Research

In the dawn of civilization science was a pastime, "a sort of intellectual game," which fascinated primitive men, possessed as

they were with a native curiosity. This is reflected in some of the terms, early introduced and current today, used in connection with the method of science. To investigate—the essence of science—means literally to follow footprints (*vestigia*). We might call it the method of Robinson Crusoe. It was what the primitive hunter did in the chase—to follow a trail.

Gradually the investigation of nature became more and more serious; from a game it became a business—a vocation or profession. Aristotle considered it a luxury for persons of wealth and leisure. Today it is no longer a luxury and no longer exclusively for persons of wealth and leisure; it is a necessity of modern life.

Moreover, science has now reached a point where great discoveries are not likely to be made, even by men of genius, by such a simple procedure as watching a chandelier swing to and fro in church, or by dropping stones from the leaning tower of Pisa. We must have more or less expensive apparatus and supplies, a properly equipped laboratory, scientific assistants, and a fund for publication so that the results of research may be given to the world—not forgetting at least a living wage for the scientific man himself.

For all these reasons science must be endowed—either by men of wealth or by the state—preferably by the former. In this connection it is well to keep in mind the fact that most of the wealth of the modern world has been made possible by the practical application of the facts and principles of pure science. It is eminently fitting, therefore, that those who have accumulated this wealth should devote at least a portion of it in generous measure to encouraging those who will forego the larger emoluments of business for the purpose of following footsteps along the trails that lead to more knowledge, and to intellectual emancipation from superstition and ignorance.

For the past seventeen years the Garden has been largely dependent for research funds on the unsurpassed generosity of three or four loyal and understanding friends. In his letter of November 15, 1920, to our Board of Trustees, offering to contribute $50,000 over a term of years to inaugurate at the Garden a research project in plant pathology, Mr. Alfred T. White expressed

FIG. 3. The Rose Garden on Rose Garden Day. June 9. (9322)

the hope that in due course the Garden would ultimately have a permanent endowment fund for research. This wish has not yet been realized. The results of the research carried on at the Garden are such as to amply justify a generous endowment fund to place this work on a permanent financial basis and provide for its continuation without the handicaps which now limit its effectiveness and its logical extension.

Brief summaries of the results of the investigations in progress at the Garden during 1936 are given on pages 39–62, following.

Public Education

Rembertus Dodoens or Dodonaeus, the founder of botanical science in the Netherlands, in the 16th century, was the first botanist to serve as a university professor in that country. He was made a professor at the university of Leiden in 1582, but the history of Dutch botany records that "the lack of a botanical garden prevented Dodoens from any activity as 'professor of botany' in the real sense." He pursued his own botanical researches, and taught in the medical faculty, but it was then considered that a botanic garden was absolutely necessary for proper instruction in botany.

The labeled collections of a botanic garden, like those of a museum, are the most distinctive means of public education. The problem of labels is both expensive and difficult. It has never been solved with entire satisfaction. During the past year the writer heard the question seriously raised as to whether it would not be better to give up the attempt to label the plants in a botanic garden because of the difficulty and expense. It was also argued that labels detract from the beauty of a garden. Shortly after this discussion there was overheard the following conversation between three young men, apparently college upperclassmen, walking in the Brooklyn Botanic Garden:

"Isn't that a fine oak!" said one. "That isn't an oak," said another, "look at the leaves." "Let us read the label," said the third (reading), "Willow Oak." "Well, well," answered the first, "I never knew before that there was an oak with leaves like a willow."

It may be granted that many visitors to a botanic garden regard

the plants merely as objects of beauty, or the trees for their shade. They are not interested to know the names or other facts about the trees and other plants. The important fact to stress, however, is that *some* are, and that it is the main concern of a botanic garden to supply knowledge, to create a desire for it, and to make it readily available *to those who seek it*. If only a small proportion learn something about plant life, have their curiosity satisfied, and their interest quickened, the label—its initial expense and the trouble of installing and maintaining it—is fully justified.

It is of the essence of public education to offer it to all. The majority may profit little from the opportunity. It is the small percentage of intellectuals who count; it is to that small number that we are indebted for all we know—for science, for civilization. Perhaps ninety percent of the human race have little or no intellectual interests. In all probability, the percentage of visitors who are interested in the educational aspects of the plantations of a botanic garden is as large as the percentage of the entire human race who have real intellectual interests along any line.

Leaflets.—The series of Brooklyn Botanic Garden *Leaflets* was established in 1913 for the purpose of giving popular information to members, teachers, and the general public concerning plant life and gardening and the collections and exhibits of the Botanic Garden. They have been specially appreciated by teachers. Their popularity is reflected by the fact that their regular circulation has reached a total of 1696, while for some issues the figure is much higher. It includes most of the states of the Union and 27 foreign countries. Ten issues a year is the regular number, but the economic condition of the Garden has made it necessary to issue a smaller number during the past three or four years, and in all probability the publication must be discontinued entirely during 1937, temporarily, we hope.

Periodical Articles on horticultural plants and gardening have appeared at frequent intervals this year (as previously) in the New York *Sun*, the New York *Times*, the *Herald-Tribune*, the *Florists Exchange*, the *Bulletin* of the American Iris Society, and various botanical, horticultural, and garden club journals. The total number of titles is 118.

Broadcasting.—In the spring of 1936 the Garden issued to its

members its first folder announcing radio broadcasts for the year on aspects of plant life and the activities of the Garden. Members of the Garden personnel began broadcasting several years before 1936. These talks appear to command a steadily increasing number of listeners, especially those on the program of the Radio Garden Club. A list of 37 talks given during the year may be found beginning on page 127 of this report. The "fan mail" resulting from these broadcasts steadily increases.

A total of 131 lectures, addresses, and scientific papers have been given by the Garden personnel during the year.

Classes.—Special attention is called to the attendance at regular Botanic Garden classes of 65,948, and at classes brought by teachers from local schools of 54,119, a total of 120,067 for all classes and lectures—an increase of 4884 over 1935.

Elementary Education

There are no statistics to indicate what percentage of boys and girls of eight to eighteen years of age would attend school voluntarily for a series of years, but it is a significant fact that nearly 66,000 children of that age level came voluntarily and eagerly to the Botanic Garden for serious study during 1936. The number has fluctuated around that total for many years, and one of the most gratifying facts is that many of these boys and girls have come regularly for as many as five to seven consecutive years. Education that makes an appeal of that kind must certainly be effective. The appended report of the curator of elementary instruction gives interesting details of this work for 1936.

Extra Mural Activities.—School used to be thought of as a *place* in a community. Now it is coming to be more and more recognized as an *activity* in the community. The work must, of course, center in some place where the activities are administered and correlated. The Brooklyn Botanic Garden, supported in part by Municipal appropriations, has always conceived it as part of its duty to render whatever educational service it could to all residents of the City, and not merely to those who could come to the Garden. As is now well known, our "extra mural" activities include the "bureau of public information," which is, in fact, the entire personnel of the Garden, functioning by mail, telephone, and

radio, as well as for those who come to the Garden in person for information. The details of these "long arm" activities will be found recorded in the appended departmental reports.

The Herbarium

"Facts must be collected," said Agassiz, "but their mere accumulation will never advance the sum of human knowledge by one step; it is the comparison of facts and their transformation into ideas that lead to a deeper insight into the significance of Nature."

A herbarium is not merely a collection of plants; it is a collection of botanical facts, easily accessible for study—for comparison and for transformation into ideas. Many of the fertilizing generalizations of botanical science were made possible or facilitated by the study of herbarium specimens, collected from the four corners of the earth and made available to the botanist who could, by no possibility, have found money and time sufficient to observe these specimens as living plants in their native countries and habitats.

In earlier reports we have stressed the fact that there is no special virtue in large numbers. This is true of such a scientific collection as a herbarium. Its size depends primarily upon the geographic range it is intended to cover; its value depends always upon the quality of the specimens, the completeness and accuracy of the data accompanying them, the care with which they are selected by collector and curator, the degree of completeness with which they cover a specified geographical area or a systematic group, and their ready accessibility.

The herbarium of the Brooklyn Botanic Garden is being devoted largely to the local flora and to groups of plants that have been the object of special study by members of staff and registered students. It aims also to include enough representative specimens to become an epitome of the plant world. Special attention is also given to plants grown in this Botanic Garden. It will never be one of the larger herbariums, but it is yearly becoming more effective for the purposes intended as above indicated. Dr. Svenson, in his appended report (p. 86) calls attention to its richness in certain items, and to its increasing use.

The herbarium is an indispensable adjunct of a botanic garden, but our own herbarium, of some 150,000 specimens, is underfinanced for providing suitable personnel, as well as specimens, field work, and supplies. An endowment specifically for this herbarium would be an effective means of advancing botanical science and education.

The Library

Hippocrates of Cos, in his treatise On the Old School of Medicine (*De prisco medicina,* 5th Century, B.C.) states that an inquirer, if he is competent, will "conduct his researches with knowledge of the discoveries already made, and make them his starting point. But anyone who, casting aside and rejecting all these means, attempts to conduct research in any other way or after another fashion, deceives and is himself deceived."

To follow this teaching of Hippocrates was never more essential than now and never more difficult, on account of the great amount of research material being published in widely scattered periodicals, both obscure and well known. This is one of the reasons why a library is so important a part of a scientific and educational institution. Another important function of the library is to make the published results of research available to amateurs and other laymen. Science could never thrive in an unsympathetic world or a world of general ignorance, and it should be one of the concerns of a scientific institution, like the Botanic Garden, not merely to conduct and publish research, but to promote public interest in science and to disseminate among the general public a knowledge of the aims and methods and results of science. From the beginning of the Garden our library has been open free, daily, to the public.

The appointment of the new librarian, Mr. William E. Jordan, is recorded on page 33. The report on the library for 1936 begins on page 92. The importance of a permanent library endowment to provide for publications, binding, personnel, and other needs cannot be overemphasized.

Cooperation with Federal Government Agencies

The Federal organizations known as WPA and PWA are frequently confused in the public mind, as to their nature, pri-

mary objectives, and relation to unemployment relief. As recently explained, "PWA is concerned primarily with the construction of large-scale public works, usually done under private contract, and with no requirement that any considerable number of its workers shall be taken from relief rolls. In practice, it has resulted in the employment of so small a proportion of those on relief that it has never seemed appropriate to include PWA expenditures in any computation of relief costs."

"WPA, on the other hand, consists of smaller and simpler operations, recruits most of its workers from persons on relief, pays a 'security wage' for limited hours of employment, and thereby closely resembles the former program of work relief." Its expenditures are a part of the cost of relief. It was established by the Federal Government in August, 1935.

Works Progress Administration

The workers here at the close of 1935 continued the same projects from January 1, 1936, with the usual fluctuations of personnel. On June 3, we signed the WPA Proposal, including outline of activities and request for approval and funds for the period beginning July 7, 1936. The WPA office estimated that the money value of the Garden's contribution (overhead, supervision, supplies, etc.) was $12,580, for the indoor workers only—not including the men on the grounds.

Indoor Workers

I. *Project Identification*
   - *a.* Official Project Number: 65–97–311.
   - *b.* Service or Job Number: 1374.
   - *c.* Descriptive Title: Cooperation with regular Brooklyn Botanic Garden personnel.
   - *d.* Sponsoring Agency: The Brooklyn Institute of Arts and Sciences.
   - *e.* Cooperating Agency: Brooklyn Botanic Garden.

II. *Duration of Project*
   - *a.* First begun under CWA or ERA: February, 1934.
   - *b.* Begun operating under WPA: August 1, 1935.
   - *c.* Estimated date of completion: May be continued indefinitely.

d. Maximum number of persons: 62.
Minimum number of persons: 39.
Number as of December 31, 1936: 55.
e. Average payroll for the year: $1406 per week.

III. *Phases of Project*

Stenography	Herbarium assistance
Typing	Photographer's assistant
Translating	Publication-Stockroom assistance
Laboratory assistance	Janitorial assistance
Switchboard operation	Guard duty in building

Assistance in Photograph and Lantern Slide Department

Outdoor Workers

On March 26 all WPA workmen assigned on outside work through the Department of Parks were removed and the projects suspended for the remainder of the year. This was a serious matter for the Garden as it left several places on the grounds badly messed up and much needed improvements incomplete—in particular, the site of the Medicinal Plant Garden, the small ravine for Cryptogams on the south shore of the lake, the Pergola for the Fleece Vine, and work on the Local Flora Section. Our own men were able, during the spring, to complete the work on the Pergola, and to complete the grading and seeding of the site of the Medicinal Plant Garden.

Data on the outdoors force of guards, technician, and handymen are given in the appended report of the horticulturist.

Cooperation with Other Organizations

United States Botanic Garden.—The report of the Sub-committee on Scope and Function, of which the director of the Brooklyn Garden is a member, was submitted to Mr. Frederic A. Delano, Chairman of the Planning Committee, by Mr. B. Y. Morrison, Chairman of the Sub-committee, on January 28, 1936.

The Department of Health of New York City arranged with the Garden for the instruction of a class of men on poisonous plants and plants that cause hay-fever. The class, of 8 members, began on July 9. Two sessions were held under the instruction of Miss Rusk.

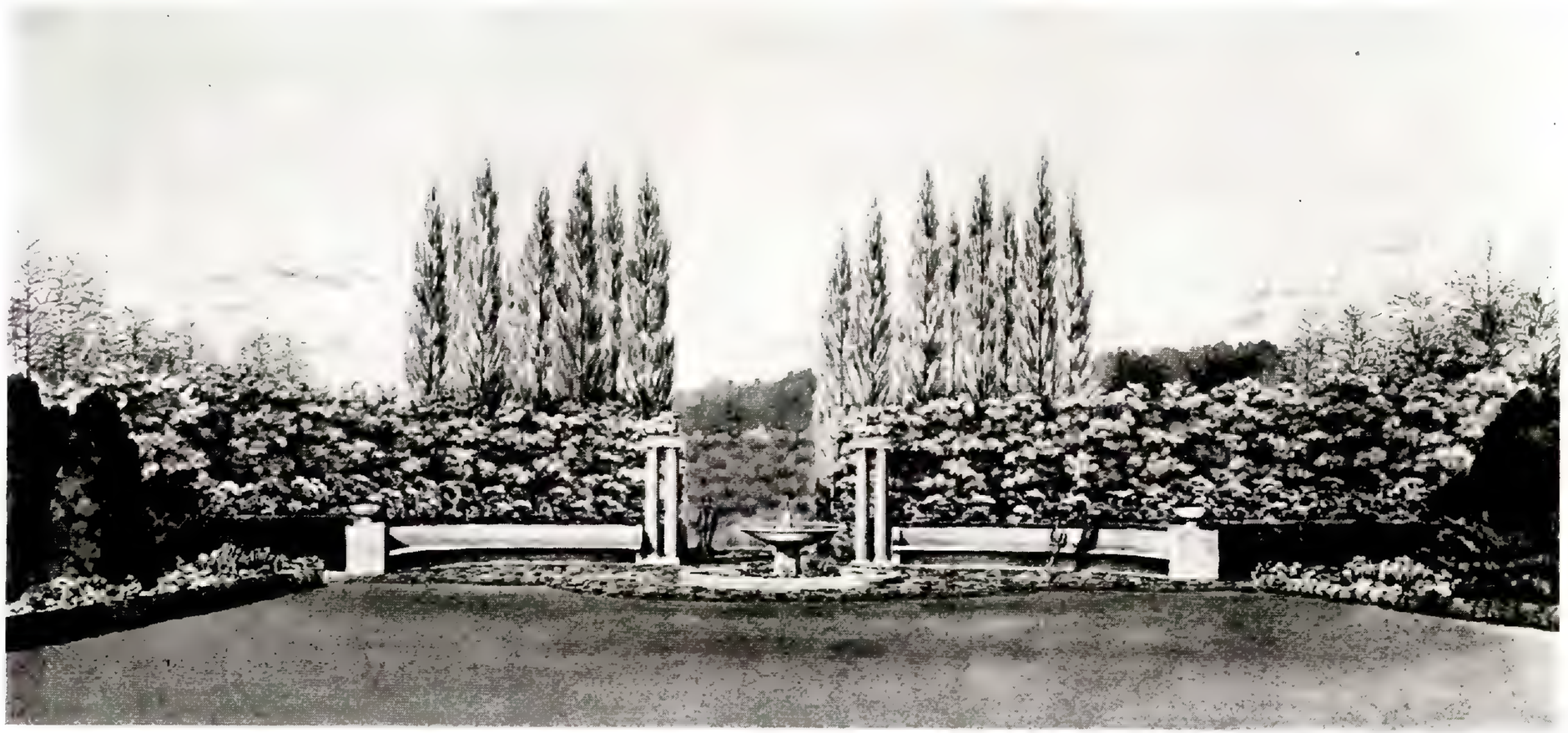

FIG. 4. Horticultural Section. Proposed fountain, seats, and columns at south end. The planting is now in place. Sketch by the landscape architect. (8996)

Department of Parks.—Last year plans were made for a closer cooperation between the Garden and the Department of Parks. The Park Commissioner had specially suggested that the Garden might issue publications and news items concerning the plant life in the Parks of the City.

During October and November we received our annual supply of leaves from Prospect Park (Mr. R. C. Jenkins, Borough Director). This is in exchange for grass supplied, as usual, by the Garden during the summer for the Park Zoo.

Among the gifts received last December were four loads of serpentine rock, given by Mr. Ernest Flagg of Dongan Hills, Staten Island. This rock was needed to provide special soil conditions in our Native Wild Flower Garden. This rock was delivered by trucks of the Department of Parks, New York City, through the courtesy of the Park Commissioner, Mr. Robert Moses.

Police Department.—The cooperation of the Police Department through Precinct 74, Captain Daniel McGlinchy, which has charge of the entire Garden inside the fence, has been most satisfactory and efficient, as has also the cooperation through Precinct 71, Captain John Mooney, having charge of Washington Avenue along the Garden frontage and our five entrances there, and through Precinct 80, Captain Edward Miller, along the two Eastern Parkway gates and frontage.

The need is constantly emphasized of adequate police surveillance, to insure proper conduct and conformity to the rules and regulations by the visiting public, and for service in emergencies.

There have been three fires in the Garden during the year, for two of which it was necessary to call the Fire Department. On April 20 a fire at the northwest corner of the Garden, near the north Flatbush Avenue gate killed about six shrubs, besides miscellaneous damage.

On May 15 it was found that during the preceding night a fire was started in the southwest corner of the woven-wood fence surrounding the Japanese Garden. This fire destroyed some twenty feet of fencing besides the damage to espalier shrubs growing on the fence.

The third fire was discovered about eight o'clock on the night

of June 2, in the peat and mulch around the blueberry shrubs in the Ericaceae section of the Garden. It was discovered just in time to save several valuable specimens.

A previously unreported fire occurred during the afternoon of October 20, 1935, spreading in the dry leaves along the Flatbush Avenue fence, and injuring and killing several shrubs. All four of these fires were the result of a pandemic and expensive narcotic habit which need not be more specifically designated.

Not all of these fires were discovered by a police officer, but they are cited here to emphasize the need of continuing oversight by policemen and guards.

Moreover, police services are needed not only when the Garden is full of people. Vandalism usually occurs, as did our four fires, when there are few visitors around or after closing hours when there are no visitors. Major and minor cases of vandalism, at times involving considerable property loss, occur annually, but we have reason to believe that the Botanic Garden is freer from this than are various other areas in the City.

Vandalism is, of course, a very old problem. Not to go back to the historic Vandals, we may get a shorter perspective on our own problem by recalling that in 1759 the Duke of Richmond threw open this collection of casts from antique sculptures to students of art. The privilege had shortly to be withdrawn because "some young men . . . mutilated . . . the statues by wantonly breaking off fingers, thumbs, and toes."

During 1936 the efficiency of police service has been enhanced by stationing in the Garden plain-clothes men and also police women in plain clothes.

At the request of Captain Field, of the Fire Alarm Telegraph Station, Washington Avenue and Empire Boulevard, our landscape architect, Mr. Caparn, went to the Station House last spring and gave advice concerning the planting of the grounds around the building.

Brooklyn Museum.—In November the Brooklyn Museum offered to send to the Garden, on long term loan, two metal Japanese Lanterns. Miss Averill, our Curator of Japanese Gardening, found suitable locations for these lanterns in the near vicinity of our Japanese Garden, and they were delivered on November 24.

They will add much to the Japanese "atmosphere" of our Japanese Garden.

State Institute of Applied Agriculture on Long Island.—In the spring of 1934 a cooperative agreement was entered into between the Botanic Garden and this Institute at Farmingdale, by which land was placed at our disposal for experimental cultures, including Iris and Sorghum, under the supervision of Dr. Reed—in 1936 about one acre for Iris and one-half acre for Sorghum. This has not only given us additional area, but also the advantage of plantations removed from the unfavorable air of the City. The plants at Farmingdale are noticeably more vigorous and healthy and the flowers of better color than those subject to the sulphur dioxide, soot, and dust of the air of Brooklyn. The State Institute, in turn, derives an educational advantage from the presence of this material readily accessible for class instruction. In his report on Research Dr. Reed acknowledges (p. 44) our indebtedness to the courtesy of Director H. B. Knapp.

Brooklyn College.—The Garden has arranged with Brooklyn College (operating under the Board of Higher Education of the City) to offer a scholarship in our Saturday field courses, as an award for superior work in the Biology Department of the College. Miss Ruth Pearl, the first botany student in the College to be awarded this scholarship, registered in the courses on Trees and Shrubs (A9 and B14).

International Flower Show.—As reported by the horticulturist, Mr. Free, our exhibit at the International Flower Show, Grand Central Palace, March 16–21, was awarded a gold medal. The exhibit was planned by Mr. Free and installed by our gardeners under his supervision. There were included more than 200 kinds of plants, some of which had never been exhibited before as rock garden plants. Series XXII, No. 1 of our *Leaflets* was devoted to this exhibit, which received more than 30 notices in newspapers and horticultural journals. The exhibit also received from the Garden Club of America a certificate of commendation for its educational value.

On Tuesday of Flower Show week, March 17, the association known as the Junior Garden Clubs of America held its annual meeting at the Garden, under the sponsorship of the publication,

Better Homes and Gardens. This Junior Garden conference is recorded in the appended report of the Curator of Elementary Instruction.

As for several years past, the Garden is obligated to Mr. William T. Hunter, of our Governing Committee, for the loan of the motor truck of his firm, A. Schroeder's Son, to transport our exhibit to and from the Grand Central Palace, Manhattan. Once again, also, Mr. Hunter served as Acting Chairman of the Governing Committee during the winter absence of Miss Loines in Florida.

Miscellaneous.—The Garden has cooperated in many ways, as usual, with various other organizations, quite too numerous for complete mention here. The Director of the Garden has continued for the ninth year as a member of the Board of the Horticultural Society of New York; for the sixteenth year as a member and the fifth year as Chairman of the Committee on Plant Quarantines of the Merchants Association of New York. He has also served as President of the Botanical Society of America for the year 1936.

Further details of cooperation are given in the appended departmental reports.

Personnel

Mr. William A. Putnam, one of the original members of the Botanic Garden Governing Committee of our trustees (since 1910), died at his home in Brooklyn on February 29, 1936. Mr. Putnam was one of the few remaining members of the group of public spirited citizens who were active in promoting the educational and cultural welfare of Brooklyn when it was an independent city, and who have continued this interest since Brooklyn became one of the five boroughs of Greater New York. This change in the municipal status, combined with the growing tendency to transfer permanent residence, and with it a portion at least of civic interest, to the suburbs, while it could not add to our sense of loss, makes the passing of these residents of the old "City" of Brooklyn more serious than might otherwise be the case. Mr. Putnam was appointed to the Botanic Garden Governing Committee by Mr. Alfred T. White. He was a life member of the Brooklyn Institute since 1901, and became a trustee in 1914. He was one of the most regular attendants at Governing Committee meetings and

at Spring and Fall Inspections of the Garden until prevented by the infirmities of age (he was 88), and a generous contributor to the private funds budget for a quarter of a century.

Mr. Gates D. Fahnestock, a member of the Board of Trustees since June, 1904, and a member of the Botanic Garden Governing Committee of the Board since 1910 (the year in which the Garden was established), died at the Peck Memorial Hospital, Brooklyn, November 5, 1936, aged 83 years and seven months. He was born at Gettysburg, Pa., April 5, 1853, and as a small boy witnessed the battle of Gettysburg. Mr. Fahnestock served on several committees of the Board, and acted as treasurer from 1904 to 1911, giving most generously of his time and ability to all Departments of The Brooklyn Institute of Arts and Sciences—Education, Museums, and Botanic Garden.

Dr. George M. Reed, Curator of Plant Pathology, was awarded the honorary degree of Doctor of Science at the annual Commencement of his alma mater, Geneva College, Beaver, Pennsylvania, in June.

Mr. William E. Jordan entered upon his duties as librarian March 16, 1936. Since the retirement of Mr. Calvin W. Foss, on sick leave from 1934 to 1935, Mrs. Emilie Perpall Chichester acted as library-assistant-in-charge. Mr. Jordan received the degree of B.S. from Cornell University in 1927, majoring in entomology and with minors in various branches of botany. This was followed by a semester of graduate study in the Yale Forestry School. He has had practical field work in the U. S. Forest Service in Montana and in the Japanese beetle laboratory in New Jersey; in Lafayette (now Acadia) National Park, Mt. Desert Island; also several months in a commercial greenhouse, and several months in a commercial nursery. Mr. Jordan graduated from Pratt Institute School of Library Science with the class of 1933. He acted as assistant in the New York Public Library, Science and Technology Division (1927–1928), and in the Library of the U. S. Department of Agriculture, Washington, D. C. (1934–1936).

Miss Margaret M. Dorward, Assistant Curator of Elementary Instruction since January 1, 1933, resumed her duties October 1, 1936, after a year's leave of absence for the purpose of study at the Swanley Horticultural College, Swanley, Kent, England.

Miss Beatrice Clark, A.B., Wellesley College, 1935, was given a temporary appointment as instructor from October 14, 1935 to June 30, 1936, in connection with the absence of Miss Dorward. She has accepted a position on the faculty of Shore Road Academy, Brooklyn.

Mr. Charles F. Doney, B.S., Cornell University, 1929, M.S., New York University, 1935, a member of the per diem personnel from December 7, 1931 to December 3, 1934, was appointed Curatorial Assistant (in charge of woody plants) in the Department of Plants, beginning as of January 1, 1935. (Omitted from preceding Annual Report.)

Philip Masterson, heating engineer since October 1, 1917, died suddenly at his home of a heart attack on Sunday, October 25. He was the second engineer in the twenty-six year's history of the Garden. During his nineteen years and twenty-five days of service Mr. Masterson was faithful and efficient in the discharge of his duties, and won the respect and affection of all his associates.

Gustav S. Jansson, who has done most of the repairs and replacement work on our heating plant and steam lines for the past nine years, and who is therefore thoroughly familiar with it, was appointed engineer in place of Mr. Masterson, beginning as of November 1.

Mrs. Evelyn M. Gailer, who came to us as Miss Williams, served as stenographer in the Department of Elementary Instruction from September 28, 1928, to February 28, 1929, and returned on September 1, 1928 to the office of the director. Mrs. Gailer resigned as of October 31.

Mrs. Helen E. Bennett, who was at the Garden as office assistant in the director's office on temporary appointment from March 13, 1935, to September 31, 1936, was appointed stenographer in place of Mrs. Gailer, beginning as of November 1.

Miss Marion L. Meurlin, who had charge of the supply of study material to High Schools, beginning September 1, 1935, resigned as of June 5, 1936.

Woman's Auxiliary

As in previous years the Garden is deeply obligated to the members of the Woman's Auxiliary for their enthusiastic support and

for the success of numerous functions wholly or largely in charge of that organization. These activities are recorded in the appended report of the Field Secretary. A list of the officers and members of the Auxiliary begins on page 134.

Membership

The number of members (1005), as of the date of publication of this report, represents a slight decrease (26) from 1935.

It should be kept in mind that some of the memberships, listed under the headings of Benefactors, Patrons, and Permanent and Life Members, do not represent any income for Botanic Garden purposes, even though, if living, they enjoy full membership privileges in the Garden. Their enrollment resulted from gifts to other Departments of the Brooklyn Institute of Arts and Sciences, in some cases made before the Botanic Garden was established or even contemplated. In other instances enrollment in Life Membership or one of the higher classes, has been in consideration of other than financial gifts, and such memberships do not represent annual income, although the gift may have been for Botanic Garden purposes.

The number of present memberships representing annual income is only approximately 679 (Annual 591, Sustaining 64, Life 18, Donor 1, Patron 3, Benefactor 2). This number, so small for a Borough of 2,600,000 population in a City of some 6,000,000, is partly a reflection of the general economic depression.

Bequest and Gifts

Frothingham Bequest.—The untimely death, on November 20, 1935, of Mr. John W. Frothingham, a trustee and a member of the Botanic Garden Governing Committee, was recorded in our preceding Annual Report under date of May 5, 1936. We received a letter from his sister, Miss Elisabeth W. Frothingham, which contained the following statement:

"My brother left with his will a letter asking me to deliver to the Botanic Garden the sum of $10,000.00 for which he left me that amount in his will, and a check for which I enclose. Thus the gift is from him, and is to be so designated. . . . I send this with my best wishes for the Garden and its important work . . . remembering, as I well do, my brother's deep interest therein."

Mr. Frothingham was an active factor in helping to make possible the continuation of our research project in plant pathology after the death of Mr. Alfred T. White, who made the initiation of the project possible. The bequest became available at a time when additional income was urgently needed. The principal has been set up as the *John W. Frothingham Bequest*, and is included for the first time in the appended financial statement for 1936, Account No. 17. In harmony with the wish of the testator, the income from this fund is restricted to the scientific and educational work of the Garden, and may not be used for general maintenance.

Rose Arc.—The generous gift of Mrs. Walter V. Cranford of $5200 to meet the cost of the Rose Arc (in effect, an extension of our Rose Garden) is recorded on page 13.

Woman's Auxiliary.—Special mention is also made of the gifts of the Woman's Auxiliary of $675 on March 16, and $325 on May 28. The first gift was applied to the cost of beautifying the grounds, and for two bronze tablets for the trees planted several years ago by Prof. Hugo deVries, of Amsterdam, Holland, and by Prof. Adolph Engler, of Berlin, Germany.

Eriophorum Cape.—An item of local historic interest is the gift by Mrs. Belle Storrs, of Brooklyn, of a shoulder cape made by her grandmother, who lived on Long Island more than 100 years ago. The cape was made by sewing the dried floral parts of the Virginia cottongrass (*Eriophorum Virginicum*), of the Sedge Family, to a cloth foundation. The numerous long, thread-like, dingy-brown bristles give surface-appearance and feel of a very soft silky fur. This *Eriophorum* is common on Long Island, and this cape is an interesting example of the economic use of native vegetation.

Narcissus Bulbs.—The appended report of the horticulturist records the gift received on November 6, from the American Narcissus Growers Association of 4823 bulbs of daffodils in 56 varieties. The members of the Association who contributed were the Stumpp and Walter Company, New York City (3750 bulbs); Mr. Hamilton F. Gronen, Gronen Daffodil Gardens, Puyallup, Washington (648 bulbs); and Arthur Bowman, Inc., Portland, Oregon (425 bulbs).

A list of the year's gifts begins on page 105. They have all

been greatly appreciated and have been acknowledged with the thanks of the Botanic Garden Governing Committee of the Trustees.

Financial

Tax Budget and Private Funds

The total budget for 1936 was $183,102.19, as against $169,248.55 in 1935, as follows:

	1935	*1936*	*Increases*
Tax Budget	$ 82,410.68	$ 89,944.31	$ 7,533.63
Private Funds	86,837.87	93,157.88	6,320.01
Totals	$169,248.55	$183,102.19	$13,853.64

The total budget for 1936 was $45,765 less than for 1930, the first year of the "depression" ($228,867–$183,102).

The Private Funds budget was $3,213.57 more than the Tax Budget. For the past eight years the percentages of the two budgets have been as follows:

	1929	*1930*	*1931*	*1932*	*1933*	*1934*	*1935*	*1936*
Tax Budget	43%	44%	48%	50%	47.2%	49.2%	48.3%	49.1%
Private Funds	57%	56%	52%	50%	52.8%	50.8%	51.7%	50.9%

The Tax Budget appropriation was $1948.69 less than was requested, as follows:

	Requested	*Granted*	*Change from 1935*
Personal Service	$72,406.00	$69,085.68	$3,320.32 Decrease
Other Codes	19,487.00	20,858.63	1,371.63 Increase
Totals	$91,893.00	$89,944.31	$1,948.69 Decrease

Needs

"It is a sad sign when, in the hour of her distress, a nation sacrifices first her intellectual institutions. Then, more than ever, when she needs all the culture, all the wisdom, all the comprehensiveness of her best intellects, should she foster the institutions that have fostered them, and in which they have been trained to do good service to their country in her time of need."

It was Louis Agassiz who found a logical place for the comment just quoted, in his *Methods of Study in Natural History,* published in 1870.

When the world-wide economic depression began in 1930 it was not only private incomes that suffered. The budgets of institutions—hospitals, colleges, museums, botanic gardens—were also seriously affected. The budget of the Brooklyn Botanic Garden fell from $228,867 in 1930 to $168,250 in 1934—a loss of $60,617. The recovery in 1936 was only $14,852.

Such loss of income of institutions was inevitable and logical, but it is also equally logical that with general economic recovery, of which there are now faint signs, the budgets of those institutions which foster knowledge and all that goes to make up civilization should also begin to recover their former effectiveness. An annual attendance equal to more than one-half the population of Brooklyn leaves no doubt but that the Brooklyn Botanic Garden is meeting a real need in the intellectual and recreational life of the City. It merits financial as well as moral support commensurate with the value and extent of its services to the community.

To a large extent the Botanic Garden is dependent upon annual contributions of funds; but when persons with large incomes become obligated to hand over in taxes to various divisions of government up to as much as 75 per cent. of their incomes (in the higher brackets), their voluntary contributions to public institutions must be correspondingly diminished. Every educational and charitable institution in America has come to realize this. In the case of the Botanic Garden, since 1918 annual contributions of thousands of dollars from individual donors have fallen to hundreds of dollars. Some have ceased entirely. Clearly, the day of large benefactions from living donors is, in general, over. The basis of hope for benefit from bequests becomes increasingly slender.

The Botanic Garden is face to face with the most serious financial situation in its history. The indication at the close of 1936 is that in 1937 we shall, for the first time in the history of the Garden, begin a new year without a balanced budget. And yet our needs and the demand of the public for the services we render will be greater than ever. Any possibility of enriching and extending our

work during the coming year seems now (December, 1936) quite out of the question.

In July, 1935, the Brooklyn Botanic Garden entered upon the second quarter century of its existence. It is a young institution. So far, it has manifested the vigor, the mistakes, and the promise of youth. It has only been able to demonstrate the lines along which a botanic garden may develop, to formulate ideals, and to lay foundations. The enrichment of its program and its progress as an institution indispensable in the cultural life of Brooklyn will depend primarily upon the financial resources made available in the near future through Tax Budget appropriations and private munificence.

Respectfully submitted,

C. Stuart Gager.

REPORTS ON RESEARCH FOR 1936

Plant Pathology

By George M. Reed

Influence of the Growth of the Host on Smut Development

Additional experiments were carried out on the influence of the growth of the oat plants on the development of the loose and covered smuts. One specialized race of the loose smut and two of the covered smut were used. Each smut was sown on two varieties, one of which was highly susceptible and the other usually gave a moderate amount of infection. Several series of inoculated plants were grown with and without nitrate, with and without phosphate, and with and without potash. In other experiments an excess of nitrate, potash, or phosphate was used.

In order to eliminate the influence of external factors on infection, the seedlings were germinated under the most favorable conditions. The seed was planted in sand with a low moisture content and germinated at a temperature of 20° C. The young seedlings were then transplanted, and from time to time the various combinations of nutrient solutions were supplied.

The results confirm those which have been obtained in previous years. In the various experiments there were very decided dif-

ferences in the rate of growth and development of the oat plants. However, the varieties fully susceptible to a particular race of smut showed practically complete infection in every series, while the varieties which showed a moderate amount of infection gave no essential differences in the various experiments.

These investigations have been supported in part by a grant from the Penrose Fund of the American Philosophical Society.

Physiologic Races of the Oat Smuts

A large number of collections of both loose and covered smuts were used to inoculate a series of varieties of oats, which belonged to different recognized species. Most of the collections have already been grouped on the basis of their behavior, and the main object was to determine more particularly their capacity for infecting varieties of oats which have been developed in comparatively recent years.

In cooperation with Mr. T. R. Stanton, Division of Cereal Crops and Diseases, Bureau of Plant Industry, Washington, D. C., extensive data on the behavior of the collections of loose and covered smuts on red oat varieties were published. Two very distinct strains of loose smut have been differentiated, one occurring on the Fulghum group of red oats, and the other on the Red Rustproof group. The Fulghum loose smut, while distinctly specialized, occurs on a rather wide range of varieties. The Red Rustproof race is much more limited in its capacity for infection. Collections of covered smut have been made only on the Fulghum group of varieties. Of special interest is the fact that these collections of covered smut attack the hitherto recognized resistant Black Mesdag. Many additional varieties of oats belonging to the red oat group, as well as others, were specially tested with these various collections of smut, and the Red Rustproof race has continued to show very sharp limitation to a few varieties.

Evidence has been obtained that there are distinct specialized subraces of both loose smut and covered smut on the Fulghum types.

Studies on the Inheritance of Resistance of Oat Hybrids to Loose and Covered Smuts

Additional experiments were carried out with a series of oat hybrids: Hybrid 83, Canadian × Black Norway; Hybrid 84, Scottish Chief × Black Mesdag; Hybrid 85, Black Mesdag × Danish Island; and Hybrid 86, Monarch Selection × Gothland. These hybrids differ in the reaction of the parental varieties to definite specialized races of loose and covered smuts. In previous years, data have been obtained on the behavior of second and third generation plants with a view to determining the mode of smut inheritance. During the past year a large number of additional third generation progenies of all of these hybrids was grown, the results supplementing those previously obtained.

Studies on Cultures of the Oat Smuts

Mr. L. Gordon Utter has continued his studies on cultures of the loose and covered smuts of oats on artificial media in flasks and has carried out infection experiments with them.

The Missouri races of loose and covered smuts of oats are distinct from one another on the basis of three definite characteristics: (1) type of smut produced on the oat spikelets; (2) the chlamydospore walls are either spiny or smooth; and (3) their capacity for infecting different oat varieties. In the loose smut the spikelets usually are entirely destroyed and replaced by black, dusty masses of chlamydospores which have spiny walls. The Gothland variety is completely susceptible to this smut, while Monarch is resistant. The covered smut only partially destroys the oat spikelets, and the chlamydospores are smooth-walled. This smut causes complete infection of Monarch, but Gothland is fully resistant.

On germination, the chlamydospores of both smuts produce a germ tube which bears four small, thin-walled spores, which can be isolated individually and cultured on a suitable medium. Sixteen single spore cultures of loose smut and six of covered smut were obtained for infection experiments.

When single spore cultures of either smut were used to inoculate the susceptible oat variety, no infection resulted. Certain

paired single spore cultures of the loose smut produced infection on Gothland and the smut was of the loose type, the chlamydospores being spiny. In the same way, properly paired single spore cultures of the covered smut gave typical covered smut type of infection on Monarch, the chlamydospores being smooth-walled. These results indicate that the infection of the oats by both smuts is dependent upon the proper combination of two definite single spore cultures.

In 1933, many single spore cultures of the loose smut were paired with similar cultures of the covered smut and inoculations were then made on Gothland and Monarch. Two of these combinations infected Monarch, but the smut resulting was of the loose type with spiny-walled chlamydospores.

This smut material was saved and used for inoculating a series of oat varieties, including Gothland and Monarch, in 1934. Similar experiments were carried out in 1935 and 1936 and analyzed on the basis of infection and smut types produced, especially on Gothland and Monarch. The results may be summarized as follows:

1. Collections or strains of loose smut were obtained capable of infecting Gothland, but not Monarch. The pathogenicity and other characteristics were typical for the loose smut. Similarly, strains of covered smut appeared which were specific in their behavior and characteristics on Monarch.

2. Several strains of the smuts were found which produced infection on both Monarch and Gothland. The smut produced, regardless of the oat variety, was typically either loose or covered smut.

3. Gothland was observed to give 15 to 100 per cent. infection with certain strains of typical covered smut, to which Monarch gave no infection, or at least gave low percentages.

4. Monarch gave 7 to 100 per cent. infection with strains of loose smut, to which Gothland usually showed no infection.

The results indicate that hybridization between the loose and covered smuts was accomplished, resulting in the production of new strains, showing the characteristics of either loose smut or covered smut, but differing decidedly in their pathogenic capacities.

Sorghum Smut Investigations

Dr. D. Elizabeth Marcy has continued the investigations on the inheritance of smut resistance in sorghum hybrids. Over a period of years, a large amount of data has been obtained on 24 different sorghum hybrids. These hybrids were tested for the reaction to both the covered smut (*Sphacelotheca sorghi*) and to the loose smut (*S. cruenta*). They represented some crosses between resistant varieties, other crosses between susceptible varieties, and a third group of crosses between resistant and susceptible varieties. Generally, the F_1, F_2, and F_3 generations were grown, but for some hybrids data were obtained for fourth and fifth generation progenies. Approximately 50,000 plants have been grown during the five year period from 1931 to 1935. The results for 12 of these crosses have been written up in final form and presented as the thesis for the degree of Doctor of Philosophy at Columbia University, and have been accepted for publication. The data for the remaining hybrids are now being prepared for publication.

The sorghum hybrids are suitable material for the study of the inheritance of many morphological characters. Sorghums are particularly favorable for such studies because of the marked differences between the parental varieties used. Accordingly, for all 24 crosses, records have been taken on various characters, particularly the color of the glumes and of the seeds. These data have been analyzed and have proved to be of considerable interest. At least one case of linkage in inheritance has been noted. Miss Theresa Rosenberg of Brooklyn College has assisted in recording much of the data.

The experiments with the influence of environment on the infection of sorghum have been continued. The effects of temperature, moisture, and sugar solution have been tested, the same conditions being supplied as in 1935. The seedlings were germinated in cups of sand, placed in the constant temperature tanks, and temperatures of 15, 17.5, 20, 22.5, 25, 27.5 and 30° C. were used. The percentage of moisture varied in the different experiments from 10 to 50 per cent. of the total water holding capacity of the sand. One set of seedlings was moistened with water, while another set received a 2 per cent. sucrose solution.

There was no attempt to control temperature or moisture after

the seedlings had emerged in the constant temperature tank. Many of the seedlings, particularly in the sucrose series, were lost on account of the growth of a fungus (*Cephalothecium roseum*) in the sand cultures, a condition which had not occurred in 1935. Nevertheless, the data were found to be in agreement with those previously secured.

Three of the four varieties used are susceptible and show typical smut infection. The fourth variety, Feterita, is seldom typically smutted. Infection of Feterita is characterized by blasting of the heads and a meager formation of smut balls. Infection for all four varieties tested was highest when the seeds had been germinated at 10 per cent. moisture. This was true for all temperatures and for both the water and sugar series. At 10 per cent. moisture, temperatures of 15 to 17.5 were most conducive to high infection in both the water and sugar series except for the variety Feterita, which was most heavily infected at 27.5 to 30. At low temperatures, infections for all varieties tested were usually slightly greater in the water series than in the sugar series. At high temperatures, slightly greater infections occurred in the sugar series as compared with the water series, while at the intermediate temperatures, infections were greatest in the sugar series when the moisture content was low but in the water series when the moisture content was high. The results indicate that these three environal factors are inter-related and limit one another. These results are particularly important in the study of inheritance of resistance in hybrids. It has been noted that in the hybrid Feterita $\times$ Sumac Sorgo, seedling environment influences the interaction between a factor for resistance brought in by Feterita and a factor for susceptibility brought in by Sumac Sorgo. Under one set of environal conditions the Feterita factor is epistatic to the Sumac Sorgo factor, while under another set of conditions the reverse is true.

We are indebted to the courtesy of Director H. B. Knapp and his associates, State Institute of Applied Agriculture on Long Island, Farmingdale, L. I., for land and facilities for conducting extensive experiments with the sorghum smuts.

The Iris

By George M. Reed

It was necessary to reset many of the Bearded iris during the past year. Many of the beds were established several years ago and the varieties have gradually deteriorated. Many additional varieties were added to the collection, most of which were comparatively new introductions. At the same time, some of the older varieties were discarded, since it is impossible to find space to continue to add varieties to the collection without discarding.

In the Annual Report for 1935 a full account of the Farmingdale Iris Garden was given. This Garden was established in cooperation with the State Institute of Applied Agriculture on Long Island on the grounds of the latter institution. A large number of varieties, representing the Dwarf, Intermediate, and Tall Bearded iris, and the various groups of Beardless iris, including Japanese, Siberian, and Southern United States, were planted. During the past year a few additional varities and species were added to the Garden.

Many seedlings of various iris hybrids are being grown. Most of them involve crosses between various types of Southern iris. A few of the first generation plants bloomed during the past year, and many additional ones will doubtless flower in 1937.

An account of hybrids between *Iris laevigata,* which is native to Japan and Northeastern Continental Asia, with the American *I. versicolor* and *I. virginica,* was published. It is very interesting that hybrids between these widely separated species have been secured. The original species, however, resemble each other in a number of important characters. In all successful crosses *I. laevigata* was the male parent.

Soft rot of the iris rhizome

This disease of the iris has caused serious damage in the beds of the Tall Bearded iris, both at the Brooklyn Botanic Garden and at Farmingdale. The trouble appeared in July and continued to attack plants through August and part of September. Many clumps of iris were destroyed, although only a few varieties were entirely lost. In order to save many of the plants it was necessary

to dig them up, separate them, and reset them. In the past the plantations at the Brooklyn Botanic Garden have been comparatively free from this serious disease of the iris. In fact, it has been noted only during the last three years, and this past season was the first one in which serious damage occurred.

Iris thrips control

The Beardless iris, especially the Japanese varieties, have been severely infested with thrips in plantings at the Brooklyn Botanic Garden. The invasion goes back several years. Frequently very serious injury to the flowers of the Japanese varieties is produced. The insect occurs in large numbers on the yellow flag of Europe (*Iris pseudacorus*) and on our native blue flag (*I. versicolor*). On these species, however, very little flower injury occurs. The foliage injury, however, may be severe on these as well as on the Japanese varieties. The insect also occurs on the Southern and other beardless types, but apparently is quite rare on the Bearded varieties. During the past few years extensive experiments on the control of these insects have been undertaken in cooperation with Dr. C. A. Weigel and Dr. Floyd F. Smith of the Division of Truck Crop and Garden Insect Investigations, Bureau of Entomology and Plant Quarantine, Washington, D. C. A method of treating the iris with hot water has been devised which has proved to be very successful. These experiments involve the use of varieties belonging to the various groups of the iris.

In April many additional treatments were made and further series in late July and October. Nearly all of the treated iris were taken out to the propagation section on the grounds of the State Institute of Applied Agriculture on Long Island at Farmingdale, where the necessary land is available, through the courtesy of the officials of the Institute.

The hot water treatments, of course, involve digging the plants and resetting them after treatment. A series of preliminary experiments was carried out to determine whether thrips could be kept in control by the use of suitable sprays.

Graduate Students and Independent Investigators Enrolled During 1936

Mr. Paul F. Brandwein, a graduate student of New York University, has continued his work in plant pathology. He has undertaken a study of the influence of inoculation and infection on oat plants by the loose and covered smuts. His data for 1936 have been written up and presented as a thesis to New York University for the Master's degree.

Dr. Marie E. Conklin continued her investigations on the bacteria which form tubercles on the wild legumes. She carried out an extensive series of field experiments with the organism causing nodule formation on the soybean. Her earlier results on "Studies of the root nodule organisms of certain wild legumes" were presented as a thesis for the degree of Doctor of Philosophy at Columbia University, and were published in *Soil Science* during the year.

Dr. Elva Lawton, a member of the Biology Department of Hunter College, has continued her studies on regeneration and polyploidy in ferns.

Forest Pathology

By Arthur Harmount Graves

Chestnut Breeding Work in 1936

For those who are unacquainted with the situation and to whom this report may come as the first one they have seen on this work, it should be stated that the American chestnut, a very valuable timber tree, has become almost extinct because of the attacks of a parasitic fungus, *Endothia parasitica*. However, certain species of chestnut which are natives of Japan and China, e.g. the Japanese (*Castanea crenata*) and the Chinese (*C. mollissima*), show considerable resistance to the attacks of the fungus. But these species, unfortunately, are trees of comparatively small stature, so that they can never supplant the American chestnut as a timber-producing species.

The Problem.—To bring back the chestnut tree (to use a common newspaper caption)—how can it be accomplished?

The Proposed Solution.—We believe the problem can be solved, first of all, by combining the quality of disease resistance inherent in the oriental species, with the tall-timber character, i.e. the lofty height growth, of the American species. Such a combination may be brought about by continued breeding, accompanied by selection of desirable types. In the meantime, also by breeding, desirable characters of other species may be incorporated into the new stock. It is on account of this last consideration that we are trying to develop many new hybrids, in addition to the chief combinations of Japanese-American and Chinese-American. For, leaving aside, for the moment, the qualities of height growth and disease resistance, many of the species, or even races within species, have other desirable qualities, such as cold or drought resistance, resistance to insect attack, and robust growth, i.e., unusual growth in thickness, as distinct from rapidity of growth in length. The quality of the nuts, too—their flavor, size, and abundance, and the precocity of blooming and fruiting, are some of the points that should be considered. For, although our primary aim is to restore a timber tree, the nuts have some value, even though proportionately small. Finally, it should be borne in mind continually that valuable recessive (i.e. hidden) characters may exist in many of the species, which continued breeding may bring to light.

For the benefit of those unfamiliar with plant breeding may we say that when, for example, plants of two different species are to be bred together or crossed, the process consists essentially of pollinating the pistils (containing the eggs) of the plant of one species with the pollen (producing the sperms) from a plant of the other species. Such pollination, if successful, results in a seed containing a "half-breed" embryo, i.e., a young plant which contains within itself a combination of the characters of both parents.

Propagation.—If and when we succeed in developing a disease resistant tree of timber type, there would always remain the difficulty of reproducing it by its nuts; for, as every botanist knows, these could not be depended upon to produce trees like the parent. Vegetative propagation is therefore the only solution; i.e., the growing of new individuals from parts or pieces of the individual which it is desired to multiply. We have tried re-

peatedly to root cuttings. Even grafting has met with only moderate success. But this fall (1936) we found a happy solution of the difficulty, for we have at last succeeded in developing roots by the layering method. The details still have to be worked out, but the fact remains that asexual propagation by this method *can* be done.

Disease Escape vs. Disease Resistance.—Some people have said to us, "How do you know your chestnut trees are not merely disease-*escaping* instead of being disease-resistant?" As we said in a former report, we are not trying to keep the disease away from our trees. The woods surrounding our five plantations are well supplied with diseased and dying shoots of the native chestnut, and the air surrounding the trees must be well laden with the fungus spores at least some of the time. Many of our hybrids have been killed by the blight. It is to be expected that some of them would inherit disease susceptibility.

But to remove any doubt about the matter, and to put the whole subject of disease resistance on a definite, scientific basis, we inoculated,* in 1936, all those trees, not only hybrids but species as well, which were large enough to inoculate with the fungus. At the same time, using the same culture of the fungus, we inoculated a large number of native shoots in the woods near the plantation for comparison. This work will be continued each year for at least three years, to see if the results of each year correspond. Finally, each individual will be given a number indicating the degree of its blight resistance.

We have been told that we may lose all our trees as a result of these inoculations. There is nothing to fear on this score; for, in the first place, if they are easily killed, they are quite undesirable. In the second place, the inoculations have been made, in every case, well up from the trunk, on side branches. These branches can easily be removed, if for any reason that should be deemed advisable.

Management of the Plantations.—In April, 1936, the National Research Council awarded us a grant-in-aid which enabled us to

* The inoculations were made by removing a piece of bark about one inch long by ⅛ inch wide. The slit thus made (cut down as far as the wood) was filled with fungus mycelium and covered with electrician's tape which was extended around the branch. The tape was removed a month later.

pay the wages of a man from April to August inclusive, also to pay for plowing and harrowing, and for fertilizer, clover seed, and various materials. Two of the plantations had been maintained under fairly clean cultivation for several years, but erosion had taken a considerable toll of the good soil during the past two years, especially during the winter rains. We therefore made a sowing, about May 1, of red clover, for a permanent ground cover; and, at the same time, we applied a light dressing of chemical fertilizer, 5–9–5, i.e., 5 parts nitrogen, 9 parts phosphorus, and 5 potash. The extra heavy application of phosphorus was made with a view to improving nut development. There has been some improvement in the growth rates, perhaps as a result of the fertilizer. Our other three plantations are in sod land. In two of them the trees are spaced 15 feet apart; in the third, which is devoted entirely to trees coming from "natural" or open pollinations, the trees are 6 feet apart. These different methods of culture have been adopted for experimental purposes. We have also a few trees growing in the woods, in the shade of tall trees—oak, maple, beech, etc. Altogether, our five plantations occupy now about 6 acres.

Spring cankerworms were again very destructive, and the war against them occupied much of our time in May and June, but peace was declared about June 15. The war against the leaf sucking lice began in July, a little earlier than usual, perhaps on account of the drought. The first spraying with nicotine sulphate came on July 13, with a second soon after, on July 16. The trees were sprayed again on August 8, 10, and 21. We have found that if the first spraying is followed up quickly in a day or two with a second application, the work is much more effective.

New Hybrids.—Following is a list of the hybrid nuts obtained from our cross pollinations in 1936.

HYBRIDS OF 1936

All at Hamden, Connecticut

No. of Nuts

2 Japanese (crenata, 5 yrs.) crossed with "S8" (10 yrs.) *

1 Japanese (crenata, 5 yrs.) crossed with American (dentata)

* S8 is the result of a cross made by Dr. Walter Van Fleet of the U. S. D. A.; apparently it is a combination of *Castanea crenata* and *C. pumila*.

17 Japanese Forest Type (crenata var., 8 yrs.) crossed with Smith Hybrid (crenata × dentata, 5 yrs.)
3 Hairy Chinese (mollissima, 10 yrs.) crossed with American (dentata, from U. S. D. A. and No. Haven, Conn.)
2 Hairy Chinese (mollissima, 10 yrs.) crossed with Japanese (crenata, Hammond)
2 Hairy Chinese (mollissima, 10 yrs.) crossed with Smith Hybrid (crenata × dentata, 5 yrs.)
(1)* 13 Hairy Chinese (mollissima, 8 and 10 yrs.) crossed with "S8," 10 yrs.
9 "S8," (10 yrs.) crossed with Japanese (crenata, Minturn)
(2) 4 "S8," (10 yrs.) crossed with American (dentata, Jennison)
** 8 "S8," (10 yrs.) crossed with Hairy Chinese (mollissima, 10 yrs.)
** 4 "S8," (10 yrs.) crossed with Smith Hybrid (crenata × dentata, 5 yrs.)
(3)* 2 Smith Hybrid (crenata × dentata, 5 yrs.) crossed with Japanese (crenata, Hammond)
2 Smith Hybrid (crenata × dentata, 5 yrs.) crossed with American (dentata, U. S. D. A.)
* 3 Smith Hybrid (crenata × dentata, 5 yrs.) crossed with Chinese Chinquapin (Seguinii)
(4) 69 Smith Hybrid (crenata × dentata, 5 yrs.) crossed with Smith Hybrid (crenata × dentata, 5 yrs.)
* 2 Smith Hybrid (crenata × dentata, 5 yrs.) crossed with "S8" (10 yrs.)

(Total) 143 hybrid nuts

Those combinations marked with a single asterisk (*) are, as far as we can ascertain from the literature, new to science. Those marked with a double asterisk (**), while not new combinations, are reciprocal crosses (i.e., the sex is reversed in each parent) which we believe have never been made before. As is the generally recognized custom, the name of the female or pistillate parent is given first. The numbers at the extreme left are for reference in the following notes.

(1) In this cross, two Chinese trees, 8 and 10 years old respectively, were the female parents. We are much pleased with this combination: we have tried it before without result. It should combine the great resistance of the "S8" with similar resistance in the Chinese. The next move should be to cross the

trees resulting from these nuts with the native American, for height growth.

(2) The American pollen used was kindly furnished us by Prof. H. M. Jennison of the U. S. Dept. of Interior, and was collected from a tree (unfortunately badly blighted) at an elevation of about 4000 feet near Mt. Sterling Gap, N. C. A second lot of pollen sent us by Prof. Jennison, from a disease-free American on Thunderhead Mountain, N. C., at 5000 ft. elevation, yielded no result after pollination of various species and hybrids. A pollination of "S8" with a good American parent is very desirable, in order to give offspring with a greater height growth. We already have 14 of these hybrids and 14 of the reciprocals. See table, p. 53.

(3) The combination of Smith Hybrid with the Japanese chestnut, i.e., a "back cross," is a good one because the pollen used here was from the fine Japanese tree of Mr. Paul Hammond at Syosset, Long Island. This tree is one of the parents of the splendid hybrid figured in last year's report.

(4) This is one of the most important items in the table because these are the second generation of Japanese-American hybrids.

Growth Rates of Hybrids at the Hamden Plantation.—The following table gives various data on the growth rates of the different hybrids, 188 in all, now growing at Hamden, Conn. The data were taken at the end of the growing season, on October 12, 1936.

If we compare the figures with those of our report for 1935, it will be seen that on the whole there was a somewhat greater growth in 1936. As the trees become older their rate of growth in length increases somewhat. How long this will continue we do not know. Careful records are being kept of the growth of each individual from year to year. We find that the phenomenon of hybrid vigor as expressed in rapid growth is constant from year to year; i.e., if a given hybrid grows 3 feet in one year, it will approximate the same length growth next year, etc. The remarkable Japanese-American hybrid figured in last year's report, then 11 feet 2 inches tall, was this year 14 feet 10½ inches, making a growth of nearly 4 feet. In 1935 it grew 4 feet 2 inches. The tables do not show the heights of these largest individuals; they are of course buried in the averages. We report a few of the outstanding ones in the table on page 54.

TABLE OF GROWTH-RATES OF HYBRID CHESTNUTS AT HAMDEN, CONNECTICUT *
1936

Name of Hybrid	Number of Trees Living October 1936	Average Height October 1936	Average Maximum Length Growth 1936	Average Mean Length Growth 1936
Folk 1931				
crenata × dentata	1	6 ft. 8 in.	23 in.	12 in.
Hammond 1931				
crenata × dentata	4	8 ft. 11 in.	34 in.	16 in.
Smith 1931				
crenata × dentata	42	6 ft. 7 in.	25 in.	13 in.
Winthrop 1931				
crenata × dentata	2	5 ft. 9 in.	25 in.	12 in.
Smith 1932				
crenata × dentata	19	51 in.	19 in.	10 in.
Hammond 1933				
crenata × dentata	3	54 in.	27 in.	14 in.
Minturn 1933				
crenata × dentata	11	57 in.	25 in.	13 in.
Graves 1934	(21)			
S8 × crenata (forest type)	7	22 in.	17 in.	—
S8 × dentata	1	15 in.	14 in.	—
mollissima × dentata	7	18 in.	14 in.	13 in.
mollissima × Seguinii	4	26 in.	23 in.	—
Smith Hybrid 1931 × dentata	2	28 in.	23 in.	22 in.
Graves 1935	(52)			
S8 × dentata	13	10 in.	—	—
mollissima × dentata	2	7 in.	—	—
mollissima × Smith Hybrid 1931	2	8 in.	—	—
mollissima var. Mammoth × dentata	11	11 in.	—	—
(mollissima-pumila U. S. D. A.) × dentata	9	7 in.	—	—
crenata × S8	5	13 in.	—	—
crenata × Smith Hybrid 1931	1	10 in.	—	—
crenata (forest type) × dentata	5	7 in.	—	—
crenata (forest type) × Seguinii	1	11 in.	—	—
Smith Hybrid 1931 × Smith Hybrid 1931	3	10 in.	—	—
Hager 1935				
dentata × mollissima	19	6 in.	—	—
dentata × S8	14	11 in.	—	—

* The table does not include the U. S. D. A. hybrids. The names at the extreme left are those of the owners of the trees on which the crosses were made.

Year When Nut Was Produced	Name	Number	Height in 1936
1931	Hammond—crenata × dentata	H86–31	14 feet $10\frac{1}{2}$ in.
"	" " "	H94–31	9 feet 6 in.
"	Winthrop — " "	W40–31	9 feet
"	Smith — " "	S170C -31	10 feet 6 in.
"	" — " "	S200B′-31	10 feet
"	" — " "	S238 -31	10 feet 7 in.
"	" — " "	S239–31	10 feet 9 in.
1932	" — " "	110 -32	9 feet 10 in.
1933	* Minturn — " "	M19′ -33	6 feet 8 in.
"	Hammond— " "	H118A′ -33	6 feet 1 in.
1934	S8 × crenata	9B–34	3 feet 5 in.
"	mollissima × Seguinii	20 -34	3 feet 4 in.
1935	dentata × S8	LI60B–35	2 feet 4 in.
"	S8 × dentata	40–35	1 foot 9 in.

The yearly records of these trees are interesting as showing the rapid rate at which they push upward. Take, for instance, the starred individual in the table. The height growths are as follows:

End of 1934, after one year's growth, 1 foot 10 in.
End of 1935, after two years' growth, 4 feet 3 in.
End of 1936, after three years' growth, 6 feet 8 in.

It is evident that all these remarkable growth rates are the expression of hybrid vigor. The growth of the native chestnut (*C. dentata*) is about one foot per year.

Disease Resistance of the Chinese Chestnut.—Last year we reported the presence of the blight at the base of 5 of our choicest Chinese chestnuts, then 9 years old. This year we take pleasure in reporting the entire healing of every one of the lesions caused by the blight on these trees. We had suspected for several years that the physical expression of resistance in the chestnut was accomplished by the formation by the tree of a cork layer immediately adjacent to the diseased tissue, effectively preventing further advances of the fungus. The appearance of a paper by Mr. W. C. Bramble * in February, 1936, describing and figuring such cork formation in lesions caused by the fungus on the American chestnut is evidence of the correctness of this view.

* Bramble, W. C. Reaction of chestnut bark to invasion by *Endothia parasitica*. Amer. Jour. Bot. **23**: 89–94. 1936.

FIG. 5. A Japanese-American hybrid 4 years old and nine feet, ten inches tall —the result of a cross of the Japanese chestnut (*Castanea crenata*) owned by Mr. Renville S. Smith of Oyster Bay, Long Island, N. Y., with pollen from shoots of the American chestnut (*Castanea dentata*) in the region of Lake Mahopac, N. Y. The cross was made by Miss Hester M. Rusk and Miss Hilda Vilkomerson in the summer of 1932. In the summer of 1936 this tree bloomed for the first time, bearing both pistillate and staminate flowers. Photographed Oct. 4, 1936, by Mr. Louis Buhle. (9259)

Although Mr. Bramble worked with *Castanea dentata* only, it is probable that a similar situation obtains in other species of chestnut. In our inoculations of the Chinese chestnut in 1936, remarkable resistance was shown, due, we believe, to the formation of such occluding cork layers.

It will be recalled that last year (1935) Mr. R. C. Ching, of the Lu-Shan Arboretum and Botanical Garden at Han-Po-Kou, Lu-Shan, Kiukiang, China, having read our report of the disastrous effect of the cold on our Chinese chestnuts, sent us some nuts from his trees (*C. mollissima*) growing at an altitude of 4000 feet. Here, he stated, they had been subjected during 1930 to a "temperature as low as 15° F. below zero, while normally the lowest temperature for the months of December, January, and February . . . ranges from 5° to 10° F. below zero." Mr. Ching sent us also nuts of *C. Henryi* and *C. Seguinii,* which came from the same locality. Most of these nuts germinated well. The best of the Chinese measured 19 inches high at the end of the season. The best seedling of *C. Henryi* measured 16 inches after having made 3 seasons' growth in one year! The Chinese chinquapins from Mr. Ching showed good growth also, but of course not as great as that of the other two species. We believe that all these chestnuts, particularly *C. mollissima,* will develop into most promising breeding stock, and we would like to acknowledge our indebtedness to Mr. Ching for his substantial expression of interest in our work.

Planting of "Naturals."—Each fall there are many nuts which develop as a result of what may be called "open pollination." In these we can be certain only of the female parent, i.e., the tree which bears the nuts. The male may be any one of the trees of the plantations which were shedding pollen at the time when the pistils were receptive. We believe, however, that in the great majority of cases, pollination is effected by pollen from other trees of the same species. In the first winter after we began planting these "naturals" (1934–5), we lost most of them from field mice, moles, and fungi. The next fall (1935) we enclosed the nuts in cylindrical wrappings of rather old and rusty wire netting (such as is used for wire screens). In this way we secured a fairly good germination last spring, but in several cases the wire netting interfered with the egress of the primary root. Last fall we tried

another method. A commercial tarry preparation which is in general use by corn growers to prevent the loss of the grain through crows, rodents, etc., was smeared on the nuts just before planting. About 250 nuts, from Chinese, Japanese, and S8 females, were planted after this treatment, and we are hoping for still better germination next spring.

New Trees Planted.—In April we received a shipment of 20 trees from the Division of Forest Pathology, U. S. D. A., as follows:

5 FP476 *Castanea crenata* from Yoshu-gun, Korea
5 GL *Castanea crenata* from Akita-ken, Japan
5 FP462 *Castanea mollissima* from near Tientsin, China
5 MAB *Castanea mollissima* from Hopeh Province, China

The first lot, from Korea, were given to Mr. Rausch, gardener for the Minturn estate at Oyster Bay Cove, L. I. Two of the next lot, from Japan, were given to Mr. J. J. DeMario and Dr. Paul H. Fairchild, both of Passaic, New Jersey. The rest were set out on our Hamden plantations.

In addition to these, two young trees, apparently Japanese, were given us on July 20 by Mr. F. A. Bartlett, of the Bartlett Tree Expert Company of Stamford, Conn. These have been set out on our plantations.

Inventory.—Following is a complete list of the numbers of individuals of all the species, varieties, and hybrids now growing on our Hamden plantations, making a total of 604 trees.

CHESTNUT SPECIES, VARIETIES, AND HYBRIDS GROWING AT HAMDEN, CONNECTICUT

October, 1936

Name	Number of Trees
Castanea Ashei—Ashe Chinquapin	14
C. crenata—Japanese Chestnut	34
C. crenata (Forest Type)—Japanese Chestnut var.	57
C. dentata—American Chestnut	49
C. Henryi—Henry Chestnut	16
C. mollissima—Hairy Chinese Chestnut	74
C. mollissima var. Mammoth—Chinese Chestnut var.	2
C. pumila—Chinquapin	4
C. sativa—Spanish Chestnut	72

C. Seguinii—Chinese Chinquapin	20
"S8" (*C. crenata* × *C. pumila*)	2
"S8" selfed	2
C. crenata (Minturn) selfed	1
C. crenata × *C. dentata*	82
C. crenata (Forest Type) × *C. dentata*	5
C. crenata × "S8"	5
C. crenata (Forest Type) × *C. Seguinii*	1
C. crenata × (*C. crenata* × *dentata*)	1
(*C. crenata* × *C. dentata*) × *C. dentata*	2
(*C. crenata* × *C. dentata*) × (*C. crenata* × *C. dentata*)	3
C. mollissima × *C. crenata* (U. S. D. A.)	9
C. mollissima × *C. dentata*	9
C. mollissima var. Mammoth × *C. dentata*	11
C. mollissima × *C. Seguinii*	4
C. mollissima × (*C. crenata* × *C. dentata*)	2
C. dentata × *C. mollissima*	19
C. dentata × "S8"	14
"S8" × *C. crenata* (Forest Type)	7
"S8" × *C. dentata*	14
(*C. mollissima* × *C. pumila*) × *C. dentata*	9
Seedlings from "open pollinations": Hamden	60
	604

Nuts Received from Outside Sources and Planted in Cold Frames, Fall, 1936

Sept. 25. *Castanea dentata* from Mr. A. Outram Sherman, Mahopac, N. Y.

C. dentata from Miss Hilda Vilkomerson, gathered at Mahopac, N. Y.

Sept. 28. *C. pumila* from U. S. D. A. nurseries at Bowie, Md. Through Mr. R. B. Clapper, Division of Forest Pathology, U. S. D. A.

C. ozarkensis from U. S. Forest Service, Russelville, Ark. Through Mr. H. R. Koen, Forest Supervisor.

Oct. 15. *C. crenata* from Mrs. Harry Whitaker, Floral Park, L. I.

C. dentata from Prof. H. M. Jennison, Elkmont, Tenn.

Castanopsis sempervirens from Prof. Frederick S. Baker, Berkeley, Calif.

Oct. 19. *Castanea dentata* from Prof. H. M. Jennison, Elkmont, Tenn.

Oct. 24. *C. crenata* from Mr. Renville S. Smith, Oyster Bay, L. I.

Dec. 8. *C. dentata* through Mr. J. Stuart Thomson, from South Dakota.

Mutation in Nature.—There is always the chance that disease-resistant chestnuts may be developing by mutation somewhere in our eastern forests. In our search of the New York region, in 1918, for an immune or very resistant native chestnut, we found that individuals vary greatly as regards their susceptibility to the disease. Evidently it holds with the species *Castanea dentata,* as with other plant species, that a great variety of strains or races exists within the species. With this consideration in mind, we are making every effort to plant all nuts which are sent to us from fruiting sprouts.

Further General Cooperation Needed.—If any who read this report know of chestnut trees which are resisting the blight, we would much appreciate a post card telling us where to find them. And if nuts of wild trees are gathered in the fall, we would be glad to receive some. But the nuts should not be allowed to become dry. A few days in a heated room are apt to be fatal. They should be wrapped in moist cotton, paper napkins, or moss, immediately after gathering, and mailed to the Brooklyn Botanic Garden. All such nuts will be carefully planted by us, and the resulting trees labelled with the name of the finder and the locality. We already have 49 such trees, from nuts coming from locations ranging from Asheville, North Carolina, to Portland, Maine.

Further, we shall soon need about 5 acres of good arable land within a reasonable distance—perhaps not more than 50 miles—of Brooklyn, N. Y., or of Hamden, Conn. We shall need this for planting new hybrids. The more hybrids we grow the better are the chances of ultimate success. We would be glad to hear from anyone who has land fulfilling these requirements.

Finally, our greatest need at present is a regular fund on which we can depend for the field expenses of this work from year to

year. The American Academy of Arts and Sciences at Boston, and the National Research Council at Washington, have granted us material assistance during the past two years. But we can not expect these grants-in-aid to be continued from year to year. The breeding of chestnut trees is a long-time project which may extend over a period of ten years or more in the future. If we could be assured of $1000 a year for that period, the chances of ultimate success would be much increased. Such an investment should yield most satisfactory returns to the donor.

Acknowledgments.—We take pleasure in acknowledging the continued cordial cooperation of the Division of Forest Pathology of the U. S. Dept. of Agriculture with us in this problem; and we sincerely appreciate the many helpful letters, the specimens of nuts, and material assistance in other ways, from sources too numerous to mention here. These evidences are sufficient proof of the great public interest in this problem.

Respectfully submitted,

ARTHUR H. GRAVES,
Curator of Public Instruction.

SYSTEMATIC BOTANY

The Classification of Dicotyledons

BY ALFRED GUNDERSEN

Studies continued during 1936 indicate clearly that there is one change in the Engler System for which the evidences appear to be especially convincing. Briefly, the groups of families represented by *Cistus* and *Papaver* should not be separated. That is, Engler's groups, Parietales and Rhoedales, in America often called Violales and Papaverales, belong together. This is not saying that these groups are necessarily wholly natural ones; only that the system of dicotyledons becomes greatly simplified by having these groups, characterized in the main by parietal placentation, adjacent.

With my last year's report was included an outline of seven systems of Dicotyledons (Sympetalae excepted) from 1824 to 1925. It shows that in the De Candolle, Bentham and Hooker, Eichler, Warming, Wettstein, and Rendle systems, *Papaver* and

Cistus are near together. Their separation must be considered a peculiarity of the Engler System. It is, in fact, indicated by Engler in his own diagram published in 1897, that these groups are closely related.

With such a large number of families united by parietal placentation and other characteristics—such as numerous stamens, separate sepals, frequent spiral arrangement of parts—the question of the relation of the various forms of placentation assumes special interest. Parietal placentation in the bud often changes to axile in the flower: the opposite is never the case. In the Introduction to his famous *Syllabus,* Engler wrote: "The natural system is now established in its principal features." When one examines recent systems of classification of dicotyledons the words, "principal features," must be used in a broad sense to make the statement a true one. The early systems were linear ones. Systems of dicotyledons with a branching arrangement, indicated by diagrams, have been published by Engler 1897, Wettstein 1911 and 1923, Bessey 1914, Hutchinson 1926, and others. Comparing these diagrams we get a good idea of differences; we see, at the same time, that there is also substantial agreement on many points. For example, differences regarding the Sympetalae are comparatively slight.

It is not to all characters of floral structures, but to those having a bearing on these differences of opinion that I have given attention in the study of flowers and their development, and with special reference to groups other than Sympetalae. Among these groups greater attention to placentation simplifies the classification.

Systematic Botany

By Henry K. Svenson

During the spring of 1936 three weeks were occupied in plant-collecting in Tennessee. The following studies have been completed or are under way.

1. Ferns of the Galapagos and Cocos Islands. A detailed report, of which the manuscript is nearly finished.

2. Report on the sedges of the Crocker Expedition to the Galapagos and Revillagigedo Islands, and western Mexico.

3. Sedges of the Fiji Islands (See bibliography).

4. Studies on the flora of southern United States (Critical notes on plants collected in 1935–1936).

5. A flora of Cocos Island (Preliminary studies).

6. Monographic Studies in *Eleocharis* IV. A manuscript of about 70 pages with 6 plates and many maps, treating the group *Tenuissimae* of tropical African and Amazonian origin, with a phenomenal development of species on the Atlantic Coastal Plain of eastern United States.

7. Flora of Fisher's Island. Identification of material collected by C. C. Hanmer.

Coffee and Tobacco Pharmacology

By Ralph H. Cheney

Further studies were made regarding the behavior of *Penicillium cyclopium* and *P. trzebinskii*, and their influence upon commercial coffee essences. The summer of 1936 was spent in research at the Marine Biological Laboratory, Woods Hole, Massachusetts. The primary subject investigated was the nature and degree of the modifications in the normal activity of the mammalian duodenum, jejunum, and ileum, caused by the plant alkaloids, caffeine and nicotine.

REPORT OF THE CURATOR OF PUBLIC INSTRUCTION FOR 1936

Dr. C. Stuart Gager, Director:

Sir: I submit herewith the report of the work (exclusive of research) of this department for the year 1936.

Garden Attendance

Entrance Gates.—The turnstiles at the five entrance gates recorded 1,567,304 visitors in 1936. This figure is smaller by 57,561 than that of 1935, the year of the celebration of the 25th anniversary of the founding of the Garden. Because of the large number of visitors for that event, and also because of the publicity resulting from it, the attendance had increased 20 per cent over

that of 1934. That this remarkable increase was not sustained in 1936 is not surprising: we should not overlook, however, the important fact that, although the 1936 figure is lower than that of 1935, it is almost 16 per cent. higher than that of 1934. And if we disregard the unusual element in the year 1935, it seems clear that an undercurrent of real increase in attendance has been maintained. The following table of attendance on the grounds for the past seven years may serve to bring this out more clearly.

Year	Attendance	Percentage of increase over previous year
1930	1,006,027	
1931	1,107,039	10.0
1932	1,307,964	18.0
1933	1,315,847	0.6
1934	1,352,407	2.7
1935	1,624,865	20.1
1936	1,567,304	— 3.5*

* Decrease from 1935, but nearly 16 per cent. increase over 1934.

Week-end Attendance.—Although there were no phenomenal week-end attendances such as occurred in 1935 (e.g. May 11–12, 1935: 43,416), there are figures well worth recording. The spring flowers made an early start, attracting 22,330 visitors during the week-end March 14–15. At this time, Snowdrops, Japanese Witch Hazel, Spring Crocuses (*Crocus tommasinianus* and *Sieberi*) in the Rock Garden, and the Winter Aconite were in full bloom; while the yellow Dutch (*C. moesiacus*) and purple and white Spring Crocuses (*C. vernus*) were beginning to open their buds. By the end of March the season was so far advanced that the beautiful display of these crocuses, naturalized in the lawns in the south-west part of the Garden, had largely disappeared. On this week-end (March 28–29) the attendance was 33,869. Large week-end attendances occurred again in May, with the beginning of the blossoming of many flowering trees and shrubs; e.g. May 9–10, 37,871, May 16–17, 34,019.

Monthly Attendance.—In 1935 the attendance figures for seven particular months exceeded previous records for those months. In 1936, in only two months, namely March and November, was the record broken: for March, 143,971, as against the best previous

figure, 118,914 for 1935 (probably the favorable weather had much to do with this); and for November, 96,987 as against the best previous record, 86,594 for this month in 1934.

The attendance for the month of December, 57,162, much larger than that of 1935 (46,658) has been exceeded only once before, and that, curiously enough, was many years ago, in the year 1928—57,538. This seems to be a good illustration of the importance of weather as a factor in attendance. Everyone now remembers what a mild month in general our last December was; few will remember the weather as far back as 1928, but the official weather reports show a remarkable similarity between the weather of December, 1928 and that of December, 1936. Both months had twenty-three days each of higher-than-normal temperatures; and the average mean temperatures were almost identical for both. But December, 1928 had less rain and more sunny hours than had December of this year. This last, perhaps, accounts for the larger attendance figure of December, 1928. If the fluctuations of attendance with the weather were worked out over a longer period of time, no doubt the same close correlation would hold.

Attendance at Conservatories.—The attendance for the year was 140,011, as against 154,659 in 1935. The figure, however, is slightly larger than that of 1934—139,544; and here, again, the combination of circumstances involved in the comparative records of attendance on the grounds (see above) may apply.

Attendance at Classes and Lectures.—The combined attendance at classes and lectures held at the Garden was 149,942, compared with 156,198 for last year.

ATTENDANCE AT THE GARDEN DURING 1936

	Jan.	Feb.	Mar.	Apr.	May	June	July
At regular classes	1,521	1,196	3,378	4,026	3,383	3,885	17,220
At visiting classes	212	509	1,758	4,839	18,153	12,768	374
At lectures to children	180	91	1,008	1,600	6,041	9,689	18
At lectures to adults ..	500	100	100	145	457	368	0
At conservatories	7,602	5,248	17,854	13,924	24,620	10,538	9,407
At grounds	60,201	35,799	143,971	183,666	260,312	151,070	167,419

	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Totals
At regular classes	18,000	3,065	2,803	3,852	3,619	65,948
At visiting classes	100	0	4,709	5,333	5,364	54,119
At lectures to children .	0	0	3,531	3,875	2,068	28,101
At lectures to adults ...	0	0	104	0	0	1,774
At conservatories	10,726	11,663	12,298	9,364	6,767	140,011
At grounds 139,838	143,711	127,168	96,987	57,162	1,567,304	

School Supply Service

During the first half of the year, Miss Marion L. Meurlin continued, under the direction of Miss Rusk, to supply study material to high schools, junior high schools, and colleges, on the same terms as of last year. Miss Meurlin resigned as of June 5. Miss Rusk continued the work until early in October, when it was taken over by Dr. D. Elizabeth Marcy, of the Department of Plant Pathology.

Miss Rusk reports: "During the seven years I supplied study material free to the higher schools, the number of requests for such material rose from 256 in 1926 to 398 in 1932, an increase of about 44 per cent.; and the number of Petri dishes filled with sterile agar rose from 1669 in 1926 to 5730 in 1932, an increase of about 243 per cent. In the three years I have supervised the supplying of study material for a charge, the number of requests has fallen from 398 in 1932 to 265 in 1936, almost as low as in 1926; and the number of Petri dishes filled has fallen from 5730 in 1932 to 1098 in 1936—lower than in any other year since 1923, and lower by nearly three hundred, than the single month of May, for example, in 1933."

Adult Courses

973 adults registered for our courses in 1936, the largest number in the history of the Garden.

In addition to courses scheduled in the Prospectus, Miss Rusk gave, in July, by request, a short course to employees of the New York City Department of Health in the identification of hay fever plants, particularly ragweed and harmful grasses, and also

STATISTICS OF SCHOOL SERVICE

	1936	1935
Loan Lectures (Lantern Slides, etc.)		
No. of sets lent	41	42
No. of teachers involved	242	556
No. of pupils attending	13,247	21,465
Material Supplied		
Total number of requests from schools	1,062	1,047
Number of different institutions	191	297
High Schools and H. S. Annexes		
Brooklyn (Total No. 41)	19	22
Queens (Total No. 25)	10	8
Manhattan (Total No. 32)	8	9
Other Boroughs (Total No. 25)	7	5
Junior High Schools (Total in Brooklyn 25)	16	23
Colleges and Universities (Total in Brooklyn 7)	8	8
Elementary		
Brooklyn (Total No. 230)	72	108
Queens (Total No. 155)	12	42
Manhattan (Total No. 141)	3	2
Other boroughs (Total No. 147)	1	3
Private and Parochial	8	27
Other Institutions	27	40
Number of potted plants for nature study	522	3,474
Number of Petri dishes filled with sterilized agar	1,098	1,409
Total number of teachers supplied with material	8,985	10,891
Total number of pupils reached	340,830	470,855
Living Plants Placed in School Rooms		
No. of schools	89	66
No. of plants	621	423
No. of teachers involved	642	542
No. of pupils reached	26,085	21,364
Plants Distributed (Raised in Classes)	43,008	29,454
No. of persons taking plants	2,551	1,508
Total number of schools represented	180	137
Seed Packets for Children		
No. of schools	473	497
No. of teachers	7,477	8,334
No. of pupils	299,058	333,361
No. of packets	897,175	1,000,084
Exhibits Provided		
No. of exhibits	9	19
Viewed by	136,925	120,740

poison ivy and poison sumac. The total registration in all the courses conducted by Miss Rusk was 98 persons.

On several of the week-ends, while I was absent on chestnut-disease work, Miss Vilkomerson had entire charge of the class in Trees and Shrubs. The course for nurses-in-training, which I conducted as usual, concluded its tenth year. Twenty-eight young women were registered in the spring, and ninety in the fall. The discrepancy in numbers is because two of the hospitals, St. Johns and Prospect Heights, now admit new students only in the fall. Therefore, in the spring, the only class coming to the Garden was the one from Kings County Hospital. The course for nurses-in-training was described in full in my annual report for 1935.

New Courses.—A course entitled "Flower Arrangement" was given on Thursdays, in October, by Mrs. Whitney Merrill. Dr. Gundersen gave a new course on "Lilacs" in May, and one on "Evergreens" in October. Both of these last were held out-of-doors in the Garden, making use of the living plants for study. The course in "Practical Gardening" was conducted by Mr. Free on Monday evenings from February 3 to March 2. This was the first time an evening course has been offered by the Garden.

Flower Days

The following schedule gives the Flower Days held during 1936, with attendant details.

Tuesday, June 16. Ninth Annual Rose Garden Day. *Leader:* Mr. R. Marion Hatton, Secretary of the American Rose Society. *Topic:* Roses.

Tuesday, October 6. Fall Rose Garden Day. *Leader:* Mr. Montague Free. *Topic:* Thoughts on rose growing.

Friday, October 30. Chrysanthemum Day. *Leader:* Mr. Henry E. Downer, Horticulturist, Vassar College. *Topic:* Development of the garden chrysanthemum.

Cooperation

Department of Botany.—Continuing the cooperation with the Department of Botany of the Department of Education, Brooklyn

Institute of Arts and Sciences, along the line begun in 1934, the following programs were held on Wednesday evenings at the Garden:

February 5. Fungi: friends or foes of man. Miss Grace A. Petersen.

March 4. Breeding the chestnut tree. Arthur Harmount Graves.

April 1. Wild flowers of Long Island. Mrs. Clayton A. Peters.

The Annual Social Meeting of the Department of Botany was held at the Garden, as usual, on Tuesday evening, October 13. Dr. C. Stuart Gager spoke on "Some treasures from the Brooklyn Botanic Garden Library."

Jewish Hospital.—For three weeks in September Miss Rusk cooperated with the Jewish Hospital in a study of the distribution of pollen of hay fever plants, exposing agar-coated slides at a high point in the Japanese Garden.

Radio Garden Club Field Day.—On June 10 a Field Day of the Radio Garden Club was held at the Garden. Brief talks were given by members of the Extension Service of the New Jersey Agricultural Experiment Station and by members of the Garden Staff. Then the assembled guests were conducted on a tour of inspection of the grounds.

Yale University School of Forestry.—In February we sent to Professor S. J. Record of the School of Forestry, Yale University, wood specimens of rare members of the Witch Hazel Family. These were to be used by a graduate student, Mr. Y. Tang, of the Fan Memorial Institute of Biology, Peiping, China. Mr. Tang is making an anatomical study of the Hamamelidaceae (Witch Hazel Family).

Bird Lovers Club of Brooklyn.—Through Mr. Bernard P. Brennan of the Bird Lovers Club of Brooklyn, we received lists of birds seen each week on the grounds of the Garden. Beginning with the week of April 12, these lists were posted each week on the outdoor bulletin boards of the Garden, duly accrediting the Bird Lovers Club; and they were continued throughout the migratory season until June, when a list of the summer residents was posted. As we said in a news release, "Thousands of our

feathered friends over the whole length of the country evidently know this spot, for they make it their stopping place during their annual journeys northward or southward."

Editorial Work and Publicity

I continued to serve as editor of the Plant Section of General Biology for *Biological Abstracts,* and as editor of the Brooklyn Botanic Garden *Contributions.* I prepared an article on Botany in 1935 for the annual revision service of Collier's *National Encyclopedia;* and also, for the 1937 *Daffodil Yearbook,* a paper on the naturalized daffodils in the Brooklyn Botanic Garden. As editor of the Brooklyn Botanic Garden *Leaflets,* I report that six numbers were issued during 1936. During the year, 27 news releases, containing 40 articles relating to Garden events, were prepared and sent out to the principal metropolitan newspapers. 1,398 press clippings were received, as against 1,178 last year.

Circulars descriptive of our spring courses were prepared and mailed in March; of the fall courses, in September. Schedules of broadcasts by members of the Garden staff from January to June inclusive were issued in May, and from July to December, in September. This department prepared, as usual, the material for the October issue (No. 4) of the Brooklyn Botanic Garden *Record,* which comprises the *Prospectus* of courses, lectures, and other educational advantages offered by the Brooklyn Botanic Garden.

Miscellaneous Items

Bureau of Information.—As usual, numerous requests for advice on the treatment of diseased or sickly plants, inquiries about courses, programs of study, plants flowering at the Garden, etc., have been answered by letter, by telephone, and in person.

Annual Meeting of the A. A. A. S.—Miss Rusk and I attended the sessions of the American Association for the Advancement of Science at Atlantic City, December 29–31, at which I read, before the Phytopathological Society of America, a paper entitled "Breeding disease-resistant chestnut trees."

Exhibits.—Living material was supplied for exhibits of medicinal plants at two drug stores, namely the M. B. Picker Cor-

FIG. 6. Class in Junior Garden Work, planting seeds for their outdoor gardens. Flat in foreground planted to represent a garden plot. March 5. (8950)

poration of N. Y. City (Manhattan), and Liberman's Drug Store, Brooklyn. Also, specimens of plants causing hay fever—grasses and ragweeds—were furnished the Purity Pharmacy, Brooklyn. We supplied medicinal plants, as in former years, for the exhibition of Scientific Pharmacy held on June 4 by the Columbia College of Pharmacy.

Postcards to Members were sent out as follows: on February 20, to announce the new 1936 seed catalogs on exhibition in the Garden library; on March 25th, reporting the display of naturalized crocuses; on April 31, telling of the naturalized daffodils and early magnolias in bloom; on May 21, announcing the blooming of bearded irises and at the same time, the Long Island Tercentenary exhibits in the Local Flora Section and in the Rotunda of the Laboratory Building, on view during the week of June 1; and, finally, on May 22, advising members of a large quantity of annual plant seedlings available for distribution.

Radio Talks.—During the year I gave eight broadcasts on subjects relating to the Garden, from Stations WNYC and WMCA.

Research Work.—An account of this year's work in breeding the chestnut will be found on pp. 47–60 of this report.

Respectfully submitted,

ARTHUR HARMOUNT GRAVES,
Curator of Public Instruction.

REPORT OF THE CURATOR OF ELEMENTARY INSTRUCTION FOR 1936

DR. C. STUART GAGER, DIRECTOR.

Sir: I hereby present the annual report of the Department of Elementary Instruction for the year 1936.

I would call to your attention, merely as points for your records, the following: Miss Margaret M. Dorward, assistant curator of elementary instruction, who was given a year's leave of absence to study at the Swanley Horticultural College, Kent, England, returned on October 1, 1936. Miss Beatrice Clark, temporary instructor during her absence, left on June 30. The absence of Miss Dorward was felt in the work of the summer, so three of

our former students, Edward Johnson, Rosemary Kennelly, and Cord Sump, were appointed to assist for the summer. Miss Michalena L. Carroll, an artist and able teacher, has had a temporary appointment to emphasize the part botany may play in art to groups of teachers, as well as children. During the spring, Miss Barbara Capen, a graduate of Lowthorpe School of Landscape Architecture, Groton, Mass., helped in the greenhouses in order to gain some practical experience.

Junior Garden Conference.—One of the outstanding features of interest in our educational program for 1936 was the Junior Garden Conference held at the Garden on March 17, during International Flower Show week. It was an all-day conference, a teaching conference in the field of junior garden work. Seventy-five delegates were here, representing many states—Arkansas, Connecticut, New Hampshire, North Carolina, New Jersey, Michigan, Pennsylvania, New York State as far north as Buffalo, and south to Stony Brook and Riverhead, Long Island. Miss Miner and I took the morning of teaching sessions, the Woman's Auxiliary served the luncheon, and *Better Homes and Gardens* conducted the afternoon session. Calls have since come from the Garden Center Institute of Buffalo and the Skaneateles (N. Y.) Garden Club, as well as from the National Council of State Garden Clubs for assistance in forwarding Junior Garden Work.

Children's Garden.—The high spots in the children's garden are typified by the range of interest shown by our young people. An exhibit of herbs; flowers from the Shakespeare Garden; an experiment with tomatoes, seeking new varieties for our soil conditions; two model formal flower gardens worked out from plans made in Miss Carroll's class; a try-out garden of English seed: these and other projects were carried out in the 1936 garden.

The regular work went on, as usual, with thirty-one students ready for bronze medals in the fall, and eighteen for silver medals. The Garden Teachers' Association Cup was presented to Hubert Zernickow; the Butler Cup to Marjorie Niedfield, and the Bernard Goodman Memorial Cup to William McDonald. Several books were added to the children's garden library. The boys and girls filled nearly 200,000 packets of seed (for school gardens) during the summer.

Our problems which are urgent now in the garden concern light and pests. The row of poplars along the back of the garden and the pines at the south end shut off more and more light and make successful culture of crops well nigh impossible. Wild rabbits (remnants of the time when this part of the City was in the open country) and Japanese bettles are a real and serious menace.

Visiting-class work has gratifying features. More and more classes come for special series of lectures rather than one. The number given in our formal records is 271, an increase of nearly 100 over last year, but the number of schools represented in this work was nearly doubled. The attendance figure in these classes was 53,720.

An educational project with WPA docents was carried on during the spring and summer on our grounds under the leadership of Mrs. Anne Limpus and Miss Helen Marshall. The teachers involved in this project numbered 18, and the attendance figure for children was 6,338. The Curator and assistants gave two entire mornings of teaching with field work to instruct these docents in their work.

Study material was distributed by request to 138 institutions of learning, representing 8,091 teachers and 271,308 children. The requests numbered 797. Plants for decoration and Nature Rooms were given to 89 schools, and to the American Museum of Natural History.

The educational greenhouses are used for the class work of adults and children; they have raised over 43,000 plants. One hundred and eighty schools are represented in these classes. Some classes are made up of people who are not concerned with the schools. The total number of people enrolled was over 1,150, although this figure scarcely tells the story of the work, since some of these people come month after month. An aggregate figure representing the entire work would be over twice that amount.

Plants raised in the classes, plants given away to schools for study and decoration do not represent the entire output from our greenhouses. About 1,700 plants were given to school and community gardens, and 3,500 seedling plants were raised by our high school section of young people for the boys' and girls' garden.

The attendance figure for greenhouse work for both adults and

FIG. 7. Children's Garden. Fall work after the crop was harvested. September 17. (8370)

children is nearly 5,000, which does not include the attendance of Mr. Free's classes using the educational greenhouses. The following figures will give an idea of the amount of materials necessary to accommodate the above number of students.

Flower pots and pans taken home	3,915
Flats taken home	299
Potted plants taken home	2,937
Rooted cuttings taken home	1,854
Plants raised from seeds taken home	38,207
Plants raised from seeds for Children's Garden	3,500
Cuttings provided from class work	2,837
Shrubs given out to schools	145
Rose bushes given out to schools	70
Iris roots given to schools (from Dr. Reed's plantations)	290

It will be noted that these figures are steadily and rapidly increasing, and it is becoming more and more difficult to accommodate adequately such numbers of students with the equipment now available for the work. Besides actual quantity of material it is desired to increase the scope of the classwork, especially with such classes as Fundamentals of Gardening (A25) and advanced Greenhouse Work (B7). The fact that the educational greenhouses have to be kept at a temperature high enough for human comfort renders it difficult and in some cases impossible to grow certain types of plants. As we have a good number of students who come back for instruction year after year, it is quite necessary to vary the plant material offered them. We are greatly in need of a cool greenhouse. For the past few years there has been no appreciable increase in our stock plants, and we have had to rely upon the generosity of Mr. Free's department. This arrangement is far from satisfactory as it takes up too much of the gardener's time away from our greenhouses, and is at best uncertain. We should be able to provide all materials for our own classes. If additional equipment is not available in the near future, a serious problem confronts us. To curtail class enrollment would seem most unfortunate, but would appear to be the only remedy for this condition.

Among the outstanding professional demands that have been made upon me from the outside during the year are a few that

are significant. I gave one of the chief lectures at the annual convention of the Childhood Education Association, Hotel Pennsylvania, New York, on April 29. As a result of this talk on our work here, communications have been received from Texas, Colorado, the Canal Zone, and North Carolina; a special report was made to the Bureau of International Education at Geneva, Switzerland. I completed the series of lectures I had been giving once a month for six months in East Orange, N. J., to the teachers of Grades I through VI. These, too, were based on our work here.

I served as Chairman of the Judging Committee for Brooklyn Youth Week, and have continued as Honorary Secretary of the National Plant and Flower Guild, as Vice-President of the New York Chapter of the American Nature Study Society, and as a member of the National Committee on Nature-Garden Clubs for the School Garden Association. My weekly articles have appeared as usual in *The Sun* (New York) from February through October. The requests for lectures always exceed the time available for such work, but in spite of that fact, an increasing number of engagements were filled during the year, involving much time and energy and considerable travel.

Respectfully submitted,

ELLEN EDDY SHAW,
Curator of Elementary Instruction.

REPORT OF THE CURATOR OF PLANTS FOR 1936

DR. C. STUART GAGER, DIRECTOR:

Sir: Herewith I submit my report for the year ending December 31, 1936.

LILACS

During three weeks in May my time was almost entirely given to the study of the species and varieties of lilacs. In this connection I visited the Cedar Hill Nursery of the late Mr. Theodore A. Havemeyer, at Brookville, Long Island, several times to make comparisons between their lilacs and ours. In general their flowering was about three days later than ours. All our lilacs are now at least provisionally named. Species in our collection, now seven-

teen, have been planted together in the South point of the lilac triangle, leaving the main area for the horticultural varieties.

In view of the rapid changes of color with age in lilac flowers, I have attempted so far as possible to use characters other than color in their classification, in particular, size of clusters, compactness of clusters, and size of individual flowers.

Trees

At the time of flowering in spring there is not in general sufficient time for the verification of names. A large part of this work must depend on study of specimens during winter. Even so it is difficult always to have the right specimen available in all cases.

During 1936 our list of trees was separated from the list of shrubs. With the records of trees separate from the more extensive records of shrubs we hope to give better attention to each of these groups. Exclusive of Conifers, we now have about 85 genera and 330 species of trees, not counting varieties or the local flora collection. In many cases, for example maple, no more planting space is available.

Conifers

In the fall our collection of Conifers was studied. Under our city conditions a number of the species have not grown well; however, quite a few others are growing fairly well. With more special attention to this group much improvement is possible. Our collection is as yet very small.

Herbaceous Plants

With Mr. Free I made an inventory of herbaceous plants during the spring. During the year Mrs. Putz has given considerable time to this group, especially to getting specimens and records in order.

Ravine for Cryptogams

Botany, in the early history of the science, meant the study of flowers. It is only in modern times that the lower plants have assumed importance. Except for a few ferns, cryptogams have

hardly been grown in our garden. It is now hoped to remedy this with the construction now nearing completion, of a shady and moist, north-facing "ravine" on the South shore of the Lake, where it is hoped we may succeed in growing Sphagnum, Mosses, Liverworts, certain Algae, and ferns that require such a habitat.

Labels

Our system of labeling, like some other methods, was inherited. Many years ago wire supports were discarded in favor of metal rods. At various times, including the past year, we have had trouble with the lead-antimony plates being removed. Wooden labels suspended from branches are used extensively in other gardens. We have now put out about five hundred such. For tall shrubs and low trees, for example, *Prunus,* these labels have proved very satisfactory. The cost is hardly one-tenth of that of plate labels.

Exhibit

An exhibit of "Flower Structures and the Classification of Dicotyledons," comprising drawings by Miss Maud H. Purdy and diagrams prepared by Mr. Louis Buhle, was made in connection with the A. A. A. S. meeting at Atlantic City, December 27–31.

Classes

Outdoor instruction in the garden during spring and fall has interested me for many years. For two years Mr. Doney has taken over the course on Ornamental Shrubs, giving attention not only to characteristics especially at the time of flowering, but also to horticultural requirements.

Two new courses were given by me, one during May on lilacs and one during October on evergreens, including conifers and broadleaved evergreens.

Seed Exchange

The total number of seed packets distributed was 5137, the number requested was 5426. Of these, 683 packets were sent to members of the Brooklyn Botanic Garden and 4454 to our regular botanic garden exchanges—mostly in foreign countries.

Seed Packets Received:		
By collection	59	
By exchange	1,526	
By gift	137	
By purchase	3	1,725
Total		1,725
Seed Packets Distributed:		
By exchange	4,454	
To members	683	5,137
Total		5,137

Statistics Relating to Living Plants

	Species or Varieties	Plants
Living Plants Received:		
By collection	13	359
By exchange	252	454
By gift	472	6,868
By purchase	167	523
By seed	2,460	2,460
Total	3,364	10,664
Living Plants Distributed:		
To members		9,857
By gift		529
By exchange		314
Total		10,700

Iris Collections

(Reported by Dr. George M. Reed)

Bearded Iris

Received by Exchange:		
Miss Erica May Brooks, New York, N. Y.	4	varieties
Farr Nursery Company, Weiser Park, Pa.	11	"
Miss Harriette R. Halloway, Plainfield, N. J.	24	"
Mr. J. C. Nicholls, Jr., Frazer, Pa.	27	"
Mr. Walter Vestal, Little Rock, Ark.	6	"
Mr. Robert Wayman, Bayside, L. I.	27	"
Mr. Howard Weed, Weed's National Iris Gardens, Beaverton, Ore.	17	"
Colonel W. J. Young, West Point, N. Y.	15	"
Total	131	varieties

Japanese Iris

Received by Exchange:		
John Lewis Childs, Inc., Flowerfield, L. I.	47	varieties
Mr. Howard Weed, Weed's National Iris Gardens, Beaverton, Ore.	7	"
Total	54	varieties

Miscellaneous Iris

Received by Exchange:		
Dr. Ralph C. Benedict, Brooklyn, N. Y.	1 species	
Mrs. Frances E. Cleveland, Sunnybrook Iris Garden, Eatontown, N. J.	1 "	(5 var.)
Dr. Frank T. McFarland, Lexington, Ky.	3 "	
Mr. Ralph W. Shreve, Farmington, Ark.	3 "	
Mr. Robert Wayman, Bayside, L. I.	1 "	(8 var.)
Colonel W. J. Young, West Point, N. Y.	2 "	(3 ")
Total	11 species	

Labels and Signs

Labels and signs were made by Mr. John McCallum as follows:

Small galvanized iron labels for the herbaceous beds	485
Large galvanized iron labels for the herbaceous beds	40
Large lead labels for the woody plants	27
Small lead labels, rock garden type	156
Small wood labels for the rose garden and special plantings	685
Large wood labels	16
Large wooden signs	30
Cardboard signs	89
Hanging labels for the woody plants	261
Twelve inch wood labels for special plantings	200
Total	1,989

Also numerous miscellaneous numbers and signs.

Respectfully submitted,

Alfred Gundersen,
Curator of Plants.

REPORT OF THE HORTICULTURIST FOR 1936

DR. C. STUART GAGER, DIRECTOR.

Sir: I submit herewith my report for the year ending December 31, 1936.

PERSONNEL

The regular force of gardeners was the same as in 1935. The laboring force was increased to a daily average of 13.25 by the addition of two men. Three more gardeners are urgently needed if we are to maintain the collections in a manner commensurate with their importance.

Labor paid for by Governmental Relief Organizations
Works Progress Administration

Outside guards (gates and patrol) ..	2100 days	12,600 hours	Average 9 men per day
Handymen	920 days	5,520 hours	Average 5 men per day
Technician	150 days	900 hours	

SYSTEMATIC SECTION

The Hypericum hedge in the Violales area was replanted with *Hypericum densiflorum* and *H. Henryi.*

A wind storm in August caused considerable damage to trees and shrubs. One large willow was a total loss. Four men were engaged for eight days in repairing the damage.

HORTICULTURAL SECTION

The upper boulder wall and middle cinder walk on the Reservoir bank were removed. The bank was graded with 40 cubic yards of topsoil obtained from the Local Flora Section, and named horticultural forms of shrubs were added to the existing planting as follows: 12 Hibiscus, 16 Philadelphus, 11 Weigela.

Sixty-five trees and shrubs in 18 varieties were planted on the level area. Thirteen named varieties of Wisteria were planted on the pergolas to replace unnamed kinds.

Nearly 5,000 narcissus bulbs, the gift of the American Narcissus Growers Association, received through the Stumpp & Walter Co., were planted in the herbaceous border. In addition we planted 200 peonies in eight varieties, and 36 varieties of *Hemerocallis.*

Because of subsidence, the five flagstone landings of the steps leading from the Horticultural Section were taken up and relaid; and the north and south transverse flagstone walks were carried out to the paved walk.

A bubbler drinking-fountain given sometime ago by Mrs. Adrian Van Sinderen, was reset and connections made with water supply and drain.

Lilac Area

In accordance with the plan for regrouping the lilacs eighteen large bushes were transplanted.

Rose Garden

To improve the appearance of the Rose Garden, twenty pillar roses, with their cedar posts, were removed from the center beds to the side borders.

Rose Arc

Nearly 3,000 square feet of terrace banks were planted with *Rosa wichuraiana* and covered with mulch paper. Three rose beds 31′ x 6′ were made and planted with 300 H.T. roses in the spring. A semicircular bed, 145′ x 8′ was made and planted with the Rose "Clytemnestra" in the fall.

Ninety cubic yards of topsoil were removed from the area now occupied by the water basin.

Eighty feet of concrete curbing was cast and set.

Conservatories

Our conservatory collections were enriched by 67 plants of *Begonia* in 37 species and varieties, the gift of Mrs. Roswell Eldridge, and by 76 cuttings of *Begonia* in 41 varieties obtained by exchange.

We obtained by exchange 75 plants, 31 species, of *Lithops, Rimaria, Gibbaeum*, etc., belonging in groups of Mesembryanthema, which either resemble stones; or "windowed plants," the leaves of which are adapted to admit light to the assimilating tissue which is almost subterranean in habit.

FIG. 8. *Aesculus parviflora* in full bloom. Systematic Section. July 3. (9234)

Medicinal Garden

Started as a WPA project but left unfinished, the grading and low retaining wall of the medicinal garden was completed by our own men. The garden area was seeded to lawn grass in the fall. It is proposed to make the beds and plant them in 1937.

Miscellaneous

One hundred Mountain Laurel (*Kalmia latifolia*) were planted to ultimately form an evergreen screen between the Flatbush Avenue service yard and the garden. Twenty-five Japanese Yew (*Taxus cuspidata capitata*) were planted between the service yard and the street.

Fifty *Rhododendron maximum* were planted to screen the tool shed in the rear of Lily-of-the-Valley planting.

The Lily-of-the-Valley bed (1100 sq. ft.) was replanted and the surplus used as a ground cover (1200 sq. ft.) under trees south of the Local Flora Section.

The construction of a small "ravine" in which to grow cryptogams (mosses, clubmosses, horsetails, etc.) was started on the south bank of the lake. It was necessary to move 30 large Rhododendrons.

Over 400 feet of irrigation pipe was laid and 20 faucets installed in various sections of the garden.

A pipe and wire fence 265 feet long was erected around the Flatbush Avenue service yard.

Exhibits

We were awarded a Gold Medal for our exhibit of Plants for Rock Gardens at the twenty-third International Flower Show, Grand Central Palace, New York, March 16–21, 1936.

We received a Botanical Certificate for a pan of *Narcissus viridiflorus* (Green Daffodil) exhibited on November 18 at the monthly meeting of the Horticultural Society of New York.

Seed and Plant Distribution

In connection with the International Seed Exchange, 4454 packets of seed were distributed to foreign and domestic botanic

gardens and other institutions. We distributed 683 packets of seed to members of the Botanic Garden.

Surplus plants of annuals, chrysanthemum, iris, and miscellaneous herbaceous perennials totaling 9857, were distributed to 246 members in April.

Cooperation with Other Institutions

We supplied pollen of *Ulmus procera* to Dr. Smith of the Dutch Elm Disease Laboratory.

Three hundred plants of surplus annuals were given to the Greenpoint Hospital, Brooklyn, for planting on their grounds; and twenty-four greenhouse plants were supplied to the Creedmore Hospital, Long Island.

Twenty-seven large greenhouse plants were sent to Ellis Island at the request of Mr. Rudolph Reimer, Commissioner of Immigration to be used to brighten up the large hall where immigrants are detained.

Courses of Instruction

I conducted the following "Courses for Members and the General Public" at the Botanic Garden:

Practical Gardening. An evening course. Five talks with demonstrations.

Plants in the Home: How to grow them. An afternoon course. Five talks with demonstrations.

Personal Activities

I acted as a judge for the Garden Club of America at the International Flower Show, New York City, on March 16.

Three speakers were introduced on programs sponsored by Brooklyn Botanic Garden as follows:

May 29. Mrs. Ernest F. Eidlitz. WOR.
November 10. Miss Mary Averill. WOR.
November 24. Miss Ellen Eddy Shaw. WOR.

Respectfully submitted,

Montague Free,
Horticulturist and Head Gardener.

REPORT OF THE CURATOR OF THE HERBARIUM FOR 1936

DR. C. STUART GAGER, DIRECTOR.

Sir: I submit herewith my report for the year ending December 31, 1936.

Organization of the herbarium has been going on steadily, and the collection now emerges as probably one of the best small collections in the United States. There are a little over 100,000 sheets of flowering plants and ferns, fairly rich in co-types of North American plants and with unexpected richness in early collections by Torrey (circa 1816), Cooper, Cozzens, Croom, and others of the early part of the Nineteenth Century. The herbarium of E. S. Miller of Wading River, and subsequent additions by other collectors, including an assortment of the late W. C. Ferguson's plants, make the flora of Long Island exceptionally well represented. The extensive herbarium of Henry Dautun well illustrates the wealth of plant species once to be found in the New Jersey towns bordering the Hackensack River, an area now largely covered by suburban dwellings, with its native flora forever lost. Plants of the far western states are especially well shown by A. A. Heller's herbarium, purchased in 1913, containing, among other things, many of his type-sheets of *Lupinus*. From the Pacific States are also large consignments of specimens from Suksdorf, Elmer, Bolander, and others. Altogether, this comparatively small and compact herbarium-collection readily provides material for the identification of plants from the United States, and its constantly growing use is an indication of increasing accessibility. During the past year the species of several large genera such as *Carex, Panicum,* and *Helianthus*, have been placed in systematic rather than alphabetical order, an arrangement which greatly facilitates work in such complicated groups.

The writer, accompanied by Mr. Buhle, photographer for the Garden, left on April 15th for a hurried trip into the southern mountains, returning to Brooklyn May 4. Making a short stop at Charleston, South Carolina, to visit the museum and the herbarium of Stephen Elliott, we proceeded to the Cumberland Mountains of Middle Tennessee where we made Sewanee our head-

quarters. The extraordinarily backward season provided but little in the way of seed collections, but gave excellent opportunity for photographing and collecting on the Cumberland Plateau many of the rare and evanescent flowers of earliest spring, such as *Diamorpha cymosa, Saxifraga Grayana, Dodecatheon Hugeri,* and several species of *Trillium; Leavenworthia, Psoralea subacaulis, Phlox stellaria* of the cedar glades near Nashville; *Carex Barrattii* (a species "lost" to Alabama for a hundred years), and *Phlox nivalis* of the Sand Mountain area in northern Alabama. From many of these photographs lantern slides have been made. These not only increase our collection of material from the South, but represent many species never before adequately photographed.

Local Flora Section

Projects of this kind take several years before desired results can be obtained, but the planted trees have now really become an "open woods" on a small scale, and the pitch pines in the sand area begin to provide some of the atmosphere of the New Jersey pine barrens. This section is much more than a "Wild Flower Garden," as it is sometimes called, but is rather an attempt to show on a small scale and in a limited area the best features of the now rapidly-disappearing vegetation of the vicinity of New York City, and to provide ground for experimental observation of variability of poorly known or questionable plants of our area, such as species of *Helianthemum,* the small kinds of *Oenothera,* violets, asters, and golden-rods. Such a study is made possible by the variety of habitats (sand-barren, bog, woodland, open "meadow," etc.) now established in the Local Flora valley. As an example of the progress in these plantings may be mentioned the excellent and persistent growth through several years of such recalcitrant conifers (within city limits) as larch (*Larix laricina*), swamp cedar (*Chamaecyparis thyoides*), red spruce (*Picea rubra*), black spruce (*Picea mariana*), and balsam fir (*Abies balsamea*).

Changes in the Local Flora Section during 1936 have not materially affected the topography of the area. The western part has been planted with trees and shrubs transferred from more crowded areas: large-leaved poplar, aspen, button-bush, and willows. The sand-barren has been extended from the pond nearly

to the entrance gate, in this way eliminating the area of garden soil which has proved unsatisfactory for growth of native plants. Recommendations for the coming year include reconstruction of the rock-wall bordering the bog and extension of the brook to the westward. There is also the perennial request for limestone ledges for the southwestern corner of the area.

Herbarium Material Loaned

Correll, Dr. Donovan S., Duke Univ., Durham, N. C.	20
Hermann, Dr. F. J., Univ. Michigan, Ann Arbor	3
Howell, Mr. John T., Cal. Acad. Sciences, San Francisco	29
Long, Mr. Bayard, Phila. Acad. Nat. Sciences, Phila.	194
Missouri Botanical Garden, St. Louis	4
Ormsbee, Mrs. M. H., Massapequa, L. I.	136
Perry, Dr. L. M., Gray Herbarium, Harvard University	83
Sharp, Mr. A. J., Univ. Tennessee, Knoxville	17
Shaver, Dr. Jesse M., George Peabody College, Nashville	108
Weatherby, Mr. C. A., Gray Herbarium, Harvard University	7
Total	601

Herbarium Material Borrowed for Study

Bailey, Liberty Hyde, Ithaca, N. Y.	2
Bingham, Dr. Marjorie T., Cranbrook Institute of Science, Bloomfield Hills, Mich.	5
Cambridge University, Cambridge, England	1
Gray Herbarium, Harvard University	46
Hanes, Mr. C. R., Schoolcraft, Mich.	4
Howell, Mr. John T., Cal. Acad. Sciences, San Francisco	2
Humbert, Prof. H. M., Museum Nationale d'Histoire Naturelle, Paris	1
New York Botanical Garden, N. Y. City	28
Taylor, Prof. T. M. C., Univ. Toronto, Canada	63
Total	152

Herbarium Accessions and Distribution

Phanerogamic Herbarium

Accessions:

By Gift:

Beals, Mr. A. Tennyson	3
Carnegie Museum, Pittsburgh	11
Chisholm, Mrs. Maude L.	3
Correll, Mr. Donovan S.	17

Dickinson, Miss Louise	83	
Drushel, Dr. J. A.	103	
Hanmer, Mr. C. C.	200	
Hinton, Mr. George B.	3	
Jannson, Mr. K. P.	10	
Jones, Mrs. Wallace T.	9	
Palmborg, Miss E. V.	3	
Petersen, Miss Grace A.	1	
Scully, Dr. Francis J.	26	
Whitehead, Mr. J.	24	496
By Exchange:		
Allen, Mr. Wm., Greenwich, Conn.	1	
Bailey, Dr. Liberty Hyde, Ithaca, N. Y.	53	
Berkeley, University of California	139	
Cluj, Roumania, Botanical Museum of the University	308	
Demaree, Dr. Delzie, University of Oklahoma	294	
Gilbert, Dr. F. A., Marshall College, Huntington, W. Va.	100	
Gray Herbarium, Harvard University	397	
Hermann, Dr. F. J., University of Michigan, Ann Arbor	104	
Hopkins, Dr. Milton, Univ. Oklahoma, Norman	78	
Howell, Mr. John Thomas, California Academy of Sciences	35	
Kew, Royal Botanic Gardens, England	4	
McVaugh, Dr. Rogers, University of Georgia, Athens	130	
Moore, Dr. D. M., University of Arkansas, Fayetteville	100	
Muenscher, Dr. W. C., N. Y. State College Agr., Ithaca	4	
New York Botanical Garden, Bronx Park, N. Y. City	101	
Pennsylvania, University of, Philadelphia	83	
Purer, Miss Edith A., Hoover High School, San Diego, Cal.	55	
Record, Dr. S. J., Yale School of Forestry	45	
Toronto, University of, Toronto, Canada	25	
Uhler, Mr. F. M., Bur. Biological Survey, U. S. D. A.	1	
U. S. National Museum, Washington, D. C.	53	
Wiegand, Dr. K. M., Cornell University	1	
Zobel, Dr. Henrietta L., University of Denver, Colo.	211	2,322
By Purchase:		
Kittredge, Miss E. M., Vergennes, Vermont	95	95
By Collection:		
Rusk, Miss Hester M., Brooklyn Botanic Garden	1	
Svenson, Dr. Henry K., Brooklyn Botanic Garden	4,000	
Vilkomerson, Miss Hilda, Brooklyn Botanic Garden	1	4,002
Total		6,915

Miscellaneous Purchases:

Paris, Museum Nationale d'Histoire Naturelle, France, 10 photographs of type species	10	
Linnaean Society, London, England, 1 photograph of type specimen of *Helonias lacta* Ait.	1	11

Distribution:

By Exchange:

Berkeley, University of California	624	
Blake, Dr. S. T., University of Queensland	113	
California Academy of Sciences, San Francisco	64	
Church, Dr. G. L., Brown Univ., Providence, R. I.	4	
Cluj, University of, Roumania	120	
Cory, Mr. V. L., Texas Agr. Exp. Sta., Sonora	1	
Fassett, Dr. N. C., University of Wisconsin	251	
Gray Herbarium, Harvard University	566	
Griscom, Mr. Ludlow, Cambridge, Mass.	102	
Killip, Mr. Ellsworth P., Smithsonian Institution	2	
Manning, Dr. W. E., Smith College, Northampton, Mass.	122	
Michigan, University of, Ann Arbor	19	
Missouri Botanical Garden, St. Louis	217	
National Park Service, Elkmont, Tenn.	43	
Oklahoma, University of, Norman	12	
Pennsylvania, University of, Philadelphia	208	
Philadelphia Academy of Natural Sciences	68	
Purer, Miss E. A., Hoover H. S., San Diego, Cal.	73	
Shaver, Dr. Jessie M., George Peabody College, Nashville	57	
Tennessee, University of, Knoxville	488	
Thompson, Mr. J. W., Seattle	457	
Uittien, Dr. H., Deventer, Holland	1	
U. S. National Herbarium, Washington, D. C.	48	
West Virginia, University of, Morgantown	7	
Zobel, Dr. Henrietta, University of Denver	147	3,814

Cryptogamic Herbaria

Accessions:

Fungi:

By Exchange:

Dr. F. L. Tai, National Tsing Hua University, Peiping, China	13	13
Total		13

Distribution:		
By Exchange:		
Dr. Tr. Savulescu, Bucharest, Roumania	330	
Dr. F. L. Tai, National Tsing Hua University, Peiping, China	119	449
Total		449
Other Cryptogams:		
By Exchange:		
Botanical Museum of the University, Cluj, Roumania ..	46	
By Purchase:		
Grout, Mr. A. J., Newfane, Vt.	13	
Fr. Verdoorn, Leiden, Holland	100	159
Total		159

Miscellaneous Distribution

Manning, Dr. Wayne E., Smith College, Northampton, Mass. Fresh material of *Platycarya strobilacea;* also 1 photograph of fruits of *Platycarya strobilacea.*

Purer, Miss E. A., Hoover High School, San Diego, Cal. 16 photographs of sand dune vegetation.

Exhibits

April 27. N. Y. Public Library, 96th Street Branch. 16 herbarium sheets.

May 12. Annual Spring Inspection, Brooklyn Botanic Garden. Long Island Tercentenary Celebration. Exhibit of herbarium specimens of economic interest to the early settlers of L. I.

May 12. Plants in the Local Flora Section marked with special labels to show those growing on Long Island when it was first settled by the white men.

Dec. 2. At the Horticultural Society of New York. Exhibit of twenty-six herbarium specimens of H. K. Svenson's collections in the southern United States and five water colors of gentians by Miss Maud H. Purdy.

Respectfully submitted,

Henry K. Svenson,
Curator of the Herbarium.

REPORT ON THE LIBRARY FOR 1936

DR. C. STUART GAGER, DIRECTOR.

Sir: I submit herewith my report for the year ending December 31, 1936.

ACCESSIONS

The collections at present comprise 35,230 pieces, of which number 19,300 are volumes and 15,930 are pamphlets, an increase of 530 volumes and 552 pamphlets or 1,082 pieces during 1936. Volumes purchased totaled 157; volumes bound accounted for 265 of the 530 accessioned. Gifts during the year were 86 volumes, 329 pamphlets, and 713 parts. The list of donors is included in Appendix I.

Of periodicals and other serials the library received 734 as exchanges, 84 as gifts, 145 as purchases, and 7 through publication by the Garden making a total of 970 titles.

List of some important accessions

Apuleius Platonicus or Barbarus. Herbal of Pseudo-Apuleius . . . facsimile, described . . . by Dr. F. W. T. Hunger. Leyden, 1935.

Bower, F. O. Primitive land plants . . . London, 1935.

Brosse, Guy de la. Description du jardin royal des plantes medecinales, estably par le roy Louis le juste, à Paris . . . Paris, 1636.

Culpeper, Nicholas. The English physitian enlarged . . . London, 1653.

Darwin, Erasmus. Zoonomia; or, the Laws of organic life. London, 1801.

Dodge, C. W. Medical mycology . . . St. Louis, 1935.

Duggar, B. M. and others. Biological effects of radiation . . . New York, 1936.

Dutrochet, R. J. H. L'Agent immédiat du mouvement vital . . . Paris, 1826.

Edgeworth, M. P. Pollen. London, 1877.

Farrer, Reginald. Alpines and bog plants. London, 1908.

Grieve, Mrs. M. A Modern herbal . . . London, 1931.

Herbert, William. Amaryllidaceae . . . London, 1837.

Hermann, Paul. Horti Academici Lugduno-Batavi . . . 1687.

Hine, Mrs. W. R. New flower arrangements. New York, 1936.

Jung, Joachim. Doxoscopiae physicae minores . . . Hamburg, 1662.

Linné, Carl von. Disquisitio de quaestione . . . sexum plantarum . . . Petropoli, 1760.

———. Flora Jamaicensis . . . Upsala, 1759.

———. Orbis eruditi judicium . . . [Stockholm, 1741.]

Linnean Society of London. Proceedings. 1838–1914.

Nägeli, C. W. von. Beiträge zur wissenschaftlichen botanik. Leipzig, 1858–1868.
Pennell, F. W. The Scrophulariaceae of eastern temperate North America. Philadelphia, 1935.
Plukenet, Leonard. Opera. London, 1769.
Rockwell, F. F. and Grayson, E. C. Flower arrangement. New York, 1936.
Seifriz, William. Protoplasm. New York, 1936.
Senebier, Jean. Recherches sur l'influence de la lumiere solaire pour métamorphoser l'air fixe en air pur par la végétation. Geneve, 1783.
Tamura, Tsuyoshi. Art of the landscape garden in Japan. Tokyo, 1935.
Vavilov, N. I. Theoretical bases of plant breeding. Moscow, 1935.
Waksman, S. A. Humus . . . Baltimore, 1936.
Wickham, H. A. On the plantation, cultivation, and curing of Parà Indian rubber (Hevea Brasiliensis) with an account of its introduction from the west to the eastern tropics. London, 1908.
Wilkie, David. Gentians. London, 1936.
Wodehouse, R. P. Pollen grains . . . New York, 1935.
Zirkle, Conway. Beginnings of plant hybridization. Philadelphia, 1935.

Library Work

On entering upon my duties as librarian on March 16, 1936, the most pressing problem to cope with was that of the shelving of the collection. The serials collection especially had increased so that there was no room for further additions. Room was secured by moving the Experiment Stations publications from the balcony stack to the basement thus releasing about 200 shelves. Rearrangement of the classified folios gained a few more shelves. As now arranged it is estimated that there is sufficient room for seven years normal expansion. In moving we were aided by three of the gardening staff on rainy days when they could not work out of doors. Because of good weather however, work at moving soon came to a standstill until the full time help of a worker was secured through the Works Progress Administration. With this aid the serial collection was moved and the classified collection rearranged and inventoried. This same agency supplied the services of a clerical helper to compile and type an index to the library's copy of Smith and Sowerby's English botany which a former owner had had bound by families and genera thus disrupting the numerical sequence of the plates. The library collection was also gone over to make more legible the call numbers on the backs of the books, to make minor repairs, and to supply

book-plates or other mark of identification where needed. This work is progressing so that the collection as a whole will receive protection until such time as funds will be available for binding and rebinding where needed.

In addition to the regular routine work the staff cooperated in indexing a publication for the Index Londinensis Supplement which the Royal Horticultural Society is to publish. Books were assembled for exhibition in connection with the Long Island Tercentenary celebration and the Herb Luncheon of the Woman's Auxiliary, as well as the customary exhibitions on Rose Day, Chrysanthemum Day, and the regular Spring display of seed catalogs. In connection with the Herb Luncheon the collection of herbals proved of great use as sources for the illustrations used on the cover of the invitation. The Herbarium staff found the autograph collection useful in checking writing on herbarium sheets with some letters of Asa Gray in order to determine if the notes were by that botanist.

Working with a collection new to one, there is always present a sense of discovery. Finding a Charles Darwin signature on one of the library possessions gave quite a thrill. As such "association" items are found they are being recorded in the catalog. Work has been started at transcribing the scrawling holographs of famous men and typing them to facilitate reference and for use in display with the originals in exhibitions.

Reader Service

The library has been freely consulted by both the public and the staff. Two groups of PWA workers have used the collections, one to compile a bibliography, the other to gather material on the possibility of American farmers growing crops that are now largely imported.

Interlibrary Loans

During the year the library loaned 80 volumes for use in other institutions and borrowed 20 volumes for use by staff members of the Garden.

Books were loaned to: American Fern Society; Brooklyn Museum Library; Carnegie Institution of Washington, Dept. of

Genetics, Cold Spring Harbor, L. I.; Columbia University, New York; George Washington University, Washington, D. C.; Horticultural Society of New York; Long Island Biological Association, Biological Laboratory, Cold Spring Harbor, L. I.; Long Island College of Medicine, Hoagland Library, Brooklyn; New Jersey Public Library Commission, Trenton, N. J.; New York State Library, Albany, N. Y.; New York State Agricultural Experiment Station, Geneva, N. Y.; New York State College of Forestry, Syracuse, N. Y.; New York University, Washington Square Library; Pennsylvania Horticultural Society, Philadelphia, Pa.; Princeton University Library, Princeton, N. J.; Rockefeller Institute for Medical Research, New York; Rockefeller Institute for Medical Research, Dept. of Animal and Plant Pathology, Princeton, N. J.; United States Department of Agriculture, Library, Washington, D. C.; Washington University, St. Louis, Mo.; H. W. Wilson Company, New York.

Books were borrowed from: Brooklyn Public Library; Columbia University, New York; New York Botanical Garden; New York College of Pharmacy.

The statistical report follows.

Respectfully submitted,

WILLIAM E. JORDAN,
Librarian.

STATISTICAL REPORT ON THE LIBRARY

ACCESSIONS

	Autograph Letters	Portraits	Volumes	Pamphlets	Parts (Including Periodicals)
Exchange	0	0	22	156	4,482
Gift	75	13	86	329	713
Publication	0	0	0	58	50
Purchase	5	5	157	9	1,075
By binding	0	0	265	0	0
Total	80	18	530	552	6,320

Total number of volumes in library, December 31, 1935	18,770
Number of volumes added during 1936	530
Total number of volumes in library, December 31, 1936	19,300

Total number of pamphlets in library, December 31, 1935	15,378
Number of pamphlets added during 1936	552
Total number of pamphlets in library, December 31, 1936	15,930
Total number of volumes and pamphlets in library, December 31, 1935	34,148
Net increase of volumes and pamphlets during 1936	1,082
Total number of volumes and pamphlets in library, December 31, 1936	35,230

American Fern Society Collection

Number of volumes, December 31, 1935	43
Number of volumes added during 1936	0
Total number of volumes, December 31, 1936	43
Number of pamphlets, December 31, 1935	242
Number of pamphlets added during 1936	7
Total number of pamphlets, December 31, 1936	249
Number of parts added during 1936	11

Serials and Periodicals

(Including only those of which numbers were received in 1936)

Subscription	145
Gift	84
Exchange	734
Publication	7
Total	970

Cataloging

Books, Pamphlets, and Serials cataloged	1,054
Total number of cards typewritten and filed	2,540

Printed Cards

Torrey Botanical Club index cards on file, December 31, 1935	49,749
Filed during 1936	1,905
Total, December 31, 1936	51,654
Index Algarum Universalis cards	2,000

Miscellaneous

Number of users of the library	4,167
Books lent to members of the staff	1,414
Books lent to other institutions	80
Books borrowed from other institutions	20

REPORT OF THE RESIDENT INVESTIGATOR (FERNS) FOR 1936

DR. C. STUART GAGER, DIRECTOR.

Sir: I submit herewith my report for the year ending December 31, 1936.

SCHOOL SERVICE

As chairman of the Program Committee of the N. Y. Association of Biology Teachers, the 1936–1937 program of speakers was worked out with the president of the Association, Dr. Elsie M. Kupfer, of Wadleigh High School. The following list of speakers was secured: Dr. Calvin Bridges, California Institute of Technology; Prof. E. W. Sinnott, Barnard College, Columbia University; Dr. B. O. Dodge, N. Y. Botanical Garden; Dr. Oscar Riddle, Carnegie Institution, Cold Spring Harbor; Mr. Frederick Osborn, New York City.

As chairman of the Nominating Committee of the same Association, I prepared the 1936 slate of candidates, with Dr. Kupfer as the new president.

As College Representative for Biology, of the Science Council of the N. Y. City High School Department, I have served as chairman of a Committee on Science Bibliography. The Committee was appointed for the purpose of keeping high school science teachers in touch with significant literature, and to stimulate the interest of teachers to keep abreast of developments in their respective fields.

EDITORIAL WORK

Another volume, the 26th, of the American Fern Journal has been completed and issued, and paid for. A few years ago the Fern Society was unfortunate in its treasurer, but with Dr. Svenson, of the Brooklyn Botanic Garden, now serving, all accounts have been paid and a large indebtedness has been cleared up completely during 1936. The Journal and the American Fern Society are greatly indebted to Dr. Svenson and to the Brooklyn Botanic Garden for the facilities afforded; for taking care of the Fern Society Library, and for storage and custodial care of the extensive back files of the journal. Miss Hester M. Rusk, also of the Brook-

lyn Botanic Garden, has been good enough, during the year, to take over the duties of Fern Society librarian, formerly carried by the resident investigator.

Fern Work

During 1936, the collections of *Nephrolepis* have been maintained and some use of these has been made by students in other institutions. Materials have been provided for research work of one student in Brooklyn College and for two at Columbia University.

Through Dr. Reed space was made available to Miss Theresa Rosenberg, of the Biology Department of Brooklyn College, for the growing of a large number of young plants of *Nephrolepis hirsutula*. Miss Rosenberg is now using these plants in experiments on the photo-periodicity of spore production, under the direction of Professor Trelease at Columbia University.

Spores of *Nephrolepis* and of other fern species have been provided for Mr. Harry Albaum, also of the Brooklyn College Biology Department staff, who is working on a doctorate problem in the regeneration of fern prothallia under the direction of Professor Barth, at Columbia.

Studies of fern hybridity among native species have been continued through field trips and through the cultivation of plants, partly in the Local Flora Section. Some of this material has been intensively studied under the microscope by an undergraduate student of Brooklyn College, Mr. Sidney Greenfield.

Plant Conservation

Interest in plant conservation has continued, as is indicated by requests for information, for printed matter, and for rare plants nor naturalization. Of five conservation *Leaflets* written in the past by the resident investigator, three are still available, but the two longer ones and the ones more often asked for, *Game Laws for ferns and wild flowers* and *The conservation of beauty*, have long been out of print.

Respectfully submitted,

Ralph C. Benedict,
Resident Investigator (Ferns).

REPORT OF THE RESIDENT INVESTIGATOR (ECONOMIC PLANTS) FOR 1936

DR. C. STUART GAGER, DIRECTOR.

Sir: I herewith submit a report of the activities of the Resident Investigator for Economic Plants during 1936. With the consent of the Garden, the Brooklyn Botanic Garden—Long Island University Course (B–15, 16) in Economic Plants, was omitted during the 1936–1937 academic year. In anticipation of the establishment of the Botanic Garden's new herb garden, a study of several herb gardens was made in eastern Massachusetts during the summers of 1935 and 1936, in order to note the species and their arrangement which have been successful in this climate. Data compiled from such studies have been filed with the Director.

Reports on research, lectures, and publications are given elsewhere in the Annual Report under their respective headings.

Respectfully submitted,

RALPH H. CHENEY,
Resident Investigator (Economic Plants).

REPORT OF THE FIELD SECRETARY FOR 1936

DR. C. STUART GAGER, DIRECTOR.

Sir: Herewith I present my report for the year ending December 31, 1936.

The five sessions of the Flower Arrangement course were held Wednesday mornings from January 8 to February 5. Mrs. William H. Cary, Mrs. Roy M. Lincoln, Miss Hazel Heissenbuttel, and Miss Grace Cornell, of the Metropolitan Museum of Art, were the guest speakers. Through the courtesy of the Metropolitan Museum one session, devoted to a demonstration of flower arrangements with effective backgrounds, was held at the Museum. The members of both institutions were invited to attend. 156 registered for the course, and in addition a number attended single lectures.

During February and March a course in Garden Design and Horticulture was presented. Marjorie Sewell Cautley conducted three of the five periods, discussing Foliage Backgrounds, Garden Design, and Color Schemes for the Garden. Mr. Free collaborated

in two sessions with a practical discussion of the Culture and Care of Trees and Shrubs and the Details of Garden Construction. Thirty persons enrolled for the course and a number attended single lectures.

At the request of the Queens Teachers Association I gave a series of five talks and demonstrations on Flower Arrangement for a class of seventeen teachers in Jamaica during February and March. This course was repeated successfully on Thursdays, October 1 to 29, at the Garden, for a class numbering forty-six.

Between February and November I represented the Garden, arranging for meetings of various organizations at the Garden or speaking at club meetings in New Jersey, Long Island, and New York City. These meetings numbered eighteen. I also attended various meetings of garden organizations, representing the Garden.

In addition, over two hundred letters were sent to garden clubs, announcing Miss Shaw's course of Junior Garden Work, membership lists were checked in August, and personal letters sent to members in arrears. Several hundred letters were sent to a selected list concerning fall courses during September. New members were solicited by personal letters.

The Woman's Auxiliary of the Botanic Garden has had a particularly active and successful year under the chairmanship of Mrs. Irving L. Cabot. On January 30 a benefit lecture was sponsored, with Miss Jessie H. Righter as chairman. Arthur C. Pillsbury of Berkeley, California, lectured on Growing Plants Without Soil or Cultivation to an audience of more than five hundred. A second benefit lecture was held on the evening of April 28 at the home of Mrs. Otto Goetze. Miss Hilda Loines gave a talk on English Cottage Gardens, illustrated with her colored slides. Mrs. Charles E. Perkins acted as chairman for this event, which was exceptionally well attended by the members of the Auxiliary and their friends. Proceeds from these two events enabled the Auxiliary to present $1,000 to the Garden.

The annual luncheon of the Auxiliary was held on February 5 in the rotunda of the Laboratory Building. One hundred and eleven members and guests were present to hear Miss Ellen Eddy Shaw tell of the work of the Department of Elementary Instruction.

On March seventeenth, when Miss Shaw held an all day conference on Junior Garden Work, the Auxiliary served a delightful luncheon for the guests.

A third benefit, with Mrs. Russell Cruikshank as chairman, was undertaken in November—Herbs for the Garden and Table, a lecture, demonstration, and luncheon held on November 16 on the Starlight Roof of the Waldorf-Astoria. Mrs. Mortimer J. Fox lectured on the propagation of culinary herbs and the best methods of preparing them for use. Mrs. Rebecca Hufcut, the Waldorf Dietician, explained the preparation of selected herb-flavored dishes while M. Lucien Tourton, banquet chef of the Waldorf, prepared them. Luncheon, with a special menu of herb delicacies, followed. More than four hundred reservations were made by the guests who came not only from New York City and the vicinity, but also from Massachusetts, Connecticut, Pennsylvania, Maryland, and Georgia. More than five hundred copies of the recipes were distributed at the luncheon and subsequently in reply to requests.

At the annual meeting of the Woman's Auxiliary, held in December, a Constitution and By-Laws, prepared by Mrs. Lewis W. Francis and her committee, were presented and adopted by the Woman's Auxiliary. The officers, reelected to serve for 1937, include Mrs. Irving L. Cabot, President; Mrs. Charles E. Potts, Vice-President; Mrs. George E. Brower, Secretary; and Miss Jessie H. Righter, Treasurer.

Acting in the dual capacity of Field Secretary for the Garden and Executive Secretary for the Auxiliary, I have sent out during the year more than 9,400 notices of courses and activities and 2,000 letters concerning these to carefully selected lists in addition to the regular correspondence. A great deal of my time and effort has been expended in planning the Flower Arrangement courses, Garden Design, the details of the benefits, and in securing the lecturers. Seven folders or announcements have been prepared, including the folder of general information about the Botanic Garden, which was distributed at the International Flower Show in New York. From time to time I have sent announcements of these activities to garden club and horticultural publications.

Respectfully submitted,

GERTRUDE W. MERRILL,
Field Secretary.

FINANCIAL STATEMENT FOR 1936

I. Tax Budget Accounts

Code No.	*Account*	*Appropriated*	*Additional Appropriation*	*Expended*	*Balance Dec. 31, 1936*	*Balance to Code Number*
	Personal Service					
1530	Regular Employees	$56,525.68		$56,522.82	$ 2.86	
1531	Temporary Employees	12,560.00		12,560.00	0.00	
	Total Personal Service	$69,085.68		$69,082.82	$2.86	
	Other than Personal Service					
1532	Fuel Supplies	*$ 3,500.00	$1,547.23	$ 5,047.23	$0.00	
1533	Office Supplies	750.00		750.00	0.00	
1534	Laundry, Clean. Dis. Sup.	200.00		200.00	0.00	
1535	Bot. & Agric. Supplies	2,660.00		2,660.00	0.00	
1536	Motor Vehicle Supplies	* 75.00		70.02	4.98	1545
1537	General Plant Supplies	200.00		200.00	0.00	
1538	Office Equipment	40.00		40.00	0.00	
1539	General Plant Equipment	1,650.00	14.40	1,745.62	0.00	
1540	General Plant Materials	1,000.00	22.00	1,022.00	0.00	
1541	Repairs & Replacements	1,500.00	6,000.00	1,500.00	6,000.00	
1542	Light, Heat & Power	* 500.00		308.30	191.70	1539–1547
1543	Telephone Service	500.00		442.85	57.15	1539, 1544–5
1544	Carfare	50.00		72.91	0.00	
1545	Expressage & Deliveries	200.00		209.37	0.00	
1546	General Plant Service	400.00		400.00	0.00	
1547	Contingencies	50.00		190.33	0.00	
		$13,275.00	$7,583.63	$14,858.63	$6,000.00	
	Additional Appropriation	7,583.63				
	Total Other than Personal Service	$20,858.63	Total Expended	$83,941.45		
	Balance Dec. 31, 1936				$6,002.86	

1532*	Transferred to Department of Purchase, General Purchase Fund	$5,047.23
1536*	" " " " " " " "	75.00
1542*	" " " " Water Supply, Gas & Electricity	500.00
1532	" from Code 3050 Miscellaneous City Fund for Salary & Wage Accruals	$1,547.23
1539	" " " " " " " " " " " "	14.40
1540	" " " " " " " " " " " "	22.00
1541	" " " " " " " " " " " "	4,200.00
1541	" " " 3508 " Kings County" " " " " "	1,800.00

II. Private Funds Accounts

Permanent Funds Restricted	*Principal*	*Balance Jan. 1, 1936*	*Income*	*Available*	*Expended*	*Balance Dec. 31, 1936*
1. Endowment Fund	$ 50,500.00	$ 0.00	$ 2,020.00	$ 2,020.00	$ 2,020.00	$ 0.00
2. Life Membership	7,000.00	0.00	280.00	280.00	280.00	0.00
3. George C. Bracket	500.00	0.00	20.00	20.00	20.00	0.00
4. Benjamin Stuart Gager	13,417.20	26.03	536.68	562.71	535.46	27.25
5. Martha Woodward Stutzer	10,000.00	0.00	400.00	400.00	382.10	17.90
6. Mary Bates Spalding	2,697.00	109.75	107.88	217.63	0.00	217.63
7. Alfred T. White	243,149.27	0.00	9,725.96	9,725.96	9,725.96	0.00
8. A. Augustus Healy Bequest	9,798.31	0.00	391.92	391.92	391.92	0.00
9. Robert B. Woodward	25,000.00	0.00	1,000.00	1,000.00	1,000.00	0.00
10. Endowment Increment	134,671.65	0.00	5,290.71	5,290.71	5,290.71	0.00
11. A. T. White Meml. Tablet	3,889.85	0.00	155.56	155.56	155.56	0.00
12. Bklyn. Inst. Centennial	30,000.00	0.00	1,200.00	1,200.00	1,200.00	0.00
13. John D. Rockefeller, Jr.	250,000.00	0.00	10,000.00	10,000.00	10,000.00	0.00
14. Citizens Endowment	253,929.26	0.00	10,157.15	10,157.15	10.157.15	0.00
15. Henry W. Healy Trust	53,660.92	26.00	1,665.91	1,691.91	1,691.91	0.00
16. Mrs. H. C. Folger	1,000.00	49.75	40.00	89.75	27.13	62.62
17. John W. Frothingham	10,000.00	0.00	200.00	200.00	79.85	120.15
Total	$1,099,213.46	$ 211.53	$43,191.77	$43,403.30	$42,957.75	$ 445.55
Special Accounts Restricted						
18. Sustaining Membership		116.62	391.54	508.16	508.16	0.00
19. Annual Membership		2,417.03	4,742.16	7,159.19	7,004.82	154.37
20. Tuition and Sales		3,335.20	12,368.50	15,703.70	12,343.70	3,360.00
21. Botanic Garden Collection		979.56	5,849.50	6,829.06	6,829.06	0.00
22. Cary Library Allotment		0.00	80.00	80.00	76.89	3.11
23. Special Purposes		1,755.32	7,426.40	9,181.72	7,646.51	1,535.21
24. Plant Pathology Research		559.20	6,500.00	7,059.20	6,975.54	83.66
25. Special Contributions		2,993.55	240.00	3,233.55	3,192.55	41.00
Total	$1,099,213.46	$12,156.48	$37,598.10	$49,754.58	$44,577.23	$5,177.35
Grand Total	$1,099,213.46	$12,368.01	$80,789.87	$93,157.88	$87,534.98	$5,622.90

III. Summary of Total Maintenance Budget for 1936

		Income			*Expended*			
		Personal Service	*Other than Personal Service*	*Total*	*Personal Service*	*Other than Personal Service*	*Total*	*Balance Dec. 31, 1936*
Tax Budget Appropriation	49.1%	$ 69,085.68	$20,858.63	$ 89,944.31	$ 69,082.82	$14,858.63	$ 83,941.45	$ 6,002.86
Private Funds Budget	50.9%	61,673.45	31,484.43	93,157.88	61,632.45	25,902.53	87,534.98	5,622.90
Totals		$130,759.13	$52,343.06	$183,102.19	$130,715.27	$40,761.16	$171,476.43	$11,625.76

Respectfully submitted,

Daniel C. Downs,
Secretary and Accountant.

Note: The above "Financial Statement" is a transcript of Brooklyn Botanic Garden accounts in the books of the Treasurer of the Brooklyn Institute of Arts and Sciences. The Treasurer's accounts are audited annually by a Public Accountant, and a separate audit of this "Financial Statement" is not made in order to save unnecessary expense.

Edwin P. Maynard,
Treasurer.

APPENDIX 1

GIFTS RECEIVED DURING 1936

Collections Fund

Associate Alumnae of Adelphi Academy
Mrs. Frank L. Babbott
Mr. Philip A. Benson
Mr. & Mrs. Edward C. Blum
Mrs. Armin E. Brunn
Mrs. Glentworth R. Butler
Mrs. S. Parkes Cadman
Mr. Walter H. Crittenden
Dugan Brothers
Mr. Otto Ebel
Mrs. William Emerson
Girls Commercial High School Science Department
Mrs. A. A. Healy
Mr. James M. Hills
Miss Elsie O. Hincken
Mr. William T. Hunter
Miss C. Julie M. Husson
Mr. Edward A. Inghram
Miss Hilda Loines
Mrs. Stephen Loines
Mrs. William W. Marshall
Mrs. Edwin P. Maynard
Mr. Alfred E. Mudge
Mr. Dean C. Osborne
Mrs. James H. Post
Mrs. Charles E. Potts
Mrs. F. B. Pratt
Mr. Harold I. Pratt
Mrs. William A. Putnam
Mrs. Kate F. Merle Smith
Mr. J. E. Spingarn
Miss Elise W. Stutzer
Mrs. Herman Stutzer
Mrs. S. T. Stewart
Mrs. Mary Van Norden
"C. W."
Mrs. R. C. Weithas
Mrs. Alexander M. White
Miss Frances E. White
Miss Harriet H. White
Woodmere Garden Club
Peter Piper Wright
Miss Abigail Young

Construction of Rose Arc

Mrs. Walter V. Cranford $5,200.00

Compensation of Landscape Architect

Woman's Auxiliary B. B. G. 675.00

For Endowment of Trees

Women of '76 Chapter N. S. D. A. R. 50.00

Chestnut Breeding Project

National Academy of Science 350.00

Publishing Memoir No. IV Twenty-fifth Anniversary Papers

Woman's Auxiliary B. B. G. 325.00

Special Gifts for Children's Work

Miss Hilda Loines	25.00
Better Homes & Gardens, Des Moines, Ia.	25.00
Robertson Pratt	25.00
Mrs. Charles E. Perkins	25.00
Garden Center Institute of Buffalo, N. Y.	25.00

Children's Endowment Fund

Boys' and Girls' Club B. B. G.	25.00

Woman's Auxiliary Reimbursement Account

Course in Garden Design	251.20

Library

Books

American Rose Society, Harrisburg, Pa.	1
Ames, Professor Oakes, Cambridge, Mass.	1
Blatt, Miss Natalie, Brooklyn, N. Y.	1
Brooklyn Botanic Garden Boys' and Girls' Club	1
Chemical Foundation, Inc., New York, N. Y.	1
Doubleday, Doran & Company, Inc., Garden City, N. Y.	1
Downs, Mr. Daniel C., Brooklyn, N. Y.	1
Drushel, Dr. J. A., Class in the Teaching of Elementary Science, New York University	2
English Speaking Union, Washington, D. C.	1
Evans, Hon. Marcellus H., New York, N. Y.	2
Free, Mr. Montague, Brooklyn, N. Y.	4
Gager, Dr. C. Stuart, Brooklyn, N. Y.	20
Girard Free Library, Girard, Ohio	1
Graves, Dr. Arthur Harmount, Brooklyn, N. Y.	2
Gundersen, Dr. Alfred, Brooklyn, N. Y.	1
Indiana Botanic Garden, Hammond, Ind.	2
Ingersoll, Mr. Raymond V., Brooklyn, N. Y.	1
Karshan, Gloria and Donald, Brooklyn, N. Y.	1
Kokusai Bunka Shinkokai (Society for International Cultural Relations), Tokyo, Japan	1
Liu, Mr. J. C., Peiping, China	1
Long, Mrs. Walter P., Brooklyn, N. Y.	1
Low, Mrs. S. W., Brooklyn, N. Y.	13
Merrill, Mrs. Whitney, Brooklyn, N. Y.	1
Miner, Miss Frances M., Brooklyn, N. Y.	1
New York State College of Forestry, Syracuse, N. Y.	1
Parent-Teachers Association, P. S. 117, Queens	1

Roosevelt Memorial Commission, New York, N. Y.	1
Sanders, Miss Claire, Brooklyn, N. Y.	1
Schroeder, Dr. Frederick, Brooklyn, N. Y.	1
Shanahan, Mrs. T. E. J., Brooklyn, N. Y.	1
Shaw, Miss Ellen Eddy, Brooklyn, N. Y.	1
Smithsonian Institution, Washington, D. C.	1
Taylor, Mr. H. O., New York, N. Y.	1
Truslow, Mrs. Walter, Brooklyn, N. Y.	1
U. S. S. R. Institute of Plant Industry, Leningrad	1
Vavilov, Dr. N. I., Leningrad, U. S. S. R.	2
Total	84

PAMPHLETS

American Society of Naturalists (Office of Secretary, Cold Spring Harbor, L. I.)	7
American Tree Association, Washington, D. C.	1
Ames, Professor Oakes, Cambridge, Mass.	1
Anonymous	2
Baker, Mr. F. W., Concord, N. H.	6
Barnes, Mrs. A. C., Merion, Pa.	1
Benedict, Dr. Ralph Curtiss, Brooklyn, N. Y.	4
Better Homes and Gardens, Des Moines, Iowa	1
Boyce Thompson Institute for Plant Research, Yonkers, N. Y.	1
Brooklyn Botanic Garden Woman's Auxiliary	6
Burpee, W. Atlee Company, Philadelphia, Pa.	4
Carbide and Carbon Chemicals Corporation, New York, N. Y.	2
Carnegie Institution of Washington, Washington, D. C.	1
Carnegie Institution of Washington, Dept. of Genetics, Cold Spring Harbor, L. I.	36
Cheney, Dr. Ralph Holt, Brooklyn, N. Y.	1
Chiarugi, Prof. Dott. Alberto, Pisa, Italy	4
Donat, Dr. Arturo, Rio Negro, Argentina	3
DuPont de Nemours and Company, Wilmington, Del.	1
Finn, Professor W. W., Kiev, U. S. S. R.	2
Fletcher, Miss Mary MacMurray, Richmond Hill, N. Y.	1
Fosberg, Mr. F. R., Honolulu, Hawaii	2
Free, Mr. Montague, Brooklyn, N. Y.	1
Gager, Dr. C. Stuart, Brooklyn, N. Y.	121
Goodspeed, Dr. T. H., Berkeley, Cal.	2
Graves, Dr. Arthur Harmount, Brooklyn, N. Y.	4
Gundersen, Dr. Alfred, Brooklyn, N. Y.	2
Haggerty, Miss Isabel, Passaic, N. J.	1
Harper, Dr. Roland M., University, Ala.	1
Haskins, Dr. C. P., Schenectady, N. Y.	9
Inman, Dr. O. L., Antioch, Ohio	8

Japan. Board of Tourist Industry, Tokyo	13
Jones, Dr. Linus H., Amherst, Mass.	1
Jordan, Mr. William E., Brooklyn, N. Y.	1
Kaiser, Mr. Samuel, Brooklyn, N. Y.	3
Kephart, Mr. Leonard W., Washington, D. C.	1
Kew, Royal Botanic Gardens, Kew, England	1
Kittredge, Miss E. M., Vergennes, Vt.	1
Liverpool Public Museums, Liverpool, England	1
Loo, Tsung-Lê and Loo, Shih-Wei, Nanking, China	1
Looser, Mr. Gualterio, Santiago, Chile	1
Massachusetts Horticultural Society, Boston, Mass.	1
Miyake, Dr. Kiichi, Tokyo, Japan	16
Miyoshi, Dr. Manabu, Tokyo, Japan	1
New Mexico State Tourist Bureau, Santa Fe, N. M.	1
New York Times, New York, N. Y.	1
Oak, Miss Dorothy, New York, N. Y.	2
Oinoue, Dr. Y., Shizuwoka, Japan	3
Pennsylvania, University of, Library, Philadelphia. Pa.	1
Quist, Mr. Manfred, Brooklyn, N. Y.	1
Ritchie, Mr. R. R., Saratoga Springs, N. Y.	2
Rockefeller Institute for Medical Research, New York, N. Y.	13
Rothamsted Experimental Station, Harpenden, Herts, England	3
Saunders, Miss E. R., Cambridge, England	2
School Garden Association, New York, N. Y.	1
Schroeder, Dr. Frederick, Brooklyn, N. Y.	3
Spaulding, Dr. Perley, New Haven, Conn.	2
Spingarn, Mr. J. E., Amenia, N. Y.	1
Szymkiewicz, Dr. D., Lwow, Poland	3
Takahashi, Professor Kenji, Kyoto, Japan	2
Tarnavschi, Dr. I. T., Cernauti, Roumania	1
Tennessee Valley Authority, Knoxville, Tenn.	1
Thomson, Mrs. Frank Graham, Warcham, Mass.	1
Waverly Press, Inc., Baltimore, Md.	1
Webster, Mrs. Hollis, Lexington, Mass.	1
Total	324

Parts of Publications

(Exclusive of Government Documents)

American Horticultural Society, Washington, D. C.	5
American Nature Study Society	2
American Scenic and Historic Preservation Society, New York, N. Y.	1
American Tree Association, Washington, D. C.	4
Ames, Professor Oakes, Cambridge, Mass.	5
Anonymous	5
Bailey, Professor Liberty Hyde, Ithaca, N. Y.	2

Bernice P. Bishop Museum, Honolulu, Hawaii	1
Cambridge University, Botanic Garden Syndicate, Cambridge, England	1
Carnegie Institution of Washington, Washington, D. C.	4
Carpenter, Mr. D. S., Middletown Springs, Vt.	1
Clarkson, Mrs. Rosetta E., New Rochelle, N. Y.	3
Collinge, Mr. Walter E., York, England	1
Colorado Scientific Society, Denver, Colo.	2
Colorado, University of, Boulder, Colo.	3
Committee on the Relation of Electricity to Agriculture, Chicago	1
Davey Tree Expert Company, Kent, Ohio	21
Doney, Mr. Charles F., Brooklyn, N. Y.	1
DuPont de Nemours and Company, Wilmington, Del.	9
Fisher Scientific Company, Pittsburgh, Pa.	4
Florida Entomological Society, Gainesville, Fla.	1
Free, Mr. Montague, Brooklyn, N. Y.	13
Gager, Dr. C. Stuart, Brooklyn, N. Y.	32
Glasnevin Botanic Garden, Dublin, Ireland	1
Grand Canyon Natural History Association, Grand Canyon, Ariz.	1
Graves, Dr. Arthur Harmount, Brooklyn, N. Y.	44
Harvard Forest, Petersham, Mass.	1
Herb Society of America, Boston, Mass.	1
Imperial Forestry Experimental Station, Meguro, Tokyo, Japan	1
Imperial Bureau of Plant Genetics, Aberystwyth, Wales	2
Jenkins, Mr. Charles F., Mt. Airy, Philadelphia, Pa.	3
McFarland, J. Horace Company, Harrisburg, Pa.	4
Marine Biological Laboratory, Woods Hole, Mass.	5
Medical Society of the County of Kings, Brooklyn, N. Y.	14
National Research Council, Washington, D. C.	1
National Research Council of Japan, Tokyo, Japan	2
National Shade Tree Conference	1
Nebraska State Horticultural Society, Lincoln, Neb.	1
New York Public Library	2
New York State Museum, Albany, N. Y.	1
New York State University, Albany, N. Y.	2
Ohara Institute for Agricultural Research, Kurashiki, Japan	1
Oregon, University of, Eugene, Ore.	2
Pennsylvania, University of, Library, Philadelphia, Pa.	3
Queensland. Forestry Board, Brisbane	1
Reed, Dr. George M., Brooklyn, N. Y.	53
Roosevelt Wild Life Forest Experiment Station, Syracuse, N. Y.	2
Rothamsted Experimental Station, Harpenden, Herts, England	1
Royal Agricultural Society, Cairo, Egypt	2
School Garden Association, New York, N. Y.	7
Scientific Expedition to Manchoukuo, Tokyo, Japan	1
Shaw, Miss Ellen Eddy, Brooklyn, N. Y.	3
Sociedad Española de Historia Natural, Madrid, Spain	10

Southern Methodist University, Dallas, Texas	1
Struckmann, Mr. Erick, Copenhagen, Denmark	1
Taihoku Imperial University, Formosa, Japan	1
Tôhoku Imperial University, Sendai, Japan	4
Torrey Botanical Club, New York, N. Y.	2
Towson Nurseries, Inc., Towson, Md.	4
Upsala Botanical Institute, Upsala, Sweden	1
Windels, Mr. Paul, New York, N. Y.	1
Yale University, School of Forestry, New Haven, Conn.	7
Total	317

PORTRAITS AND PHOTOGRAPHS

Compton, Professor R. H., Kirstenbosch, South Africa	1
Dammerman, Dr. K. W., Buitenzorg, Java	1
Gager, Dr. C. Stuart, Brooklyn, N. Y.	3
Missouri Botanical Garden, St. Louis, Mo.	3
Nichols, Dr. G. E., New Haven, Conn.	3
Purdy, Miss Maud H., Brooklyn, N. Y.	1
Zimmele, Mr. Charles F., Brooklyn, N. Y.	1
Total	13

AUTOGRAPH LETTERS

Gager, Dr. C. Stuart, Brooklyn, N. Y.	75

MISCELLANEOUS

Doney, Mr. Charles F., Brooklyn, N. Y. Material on Christmas greens.
Gager, Dr. C. Stuart, Brooklyn, N. Y. Historical material, Ms. and letters.
New Mexico State Tourist Bureau, Santa Fe, N. M. Road map, 1936.
Ritchie, Mr. R. R., Saratoga Springs, N. Y. 7 illustrations of fossil algae.

For the Department of Plants

Living Plants

American Narcissus Growers' Association, 4623 *Narcissus* bulbs.
Bernhardt, Dr. A., Brooklyn, N. Y., 1 root of *Colocasia* and 2 germinating fruits of *Sechium edule* and 1 *Epigaea repens*.
Betscher, Mr. C., Dover, Ohio, 36 plants of *Hemerocallis* species.
Birdsall, Miss J. A., Brooklyn, N. Y., 3 species, 4 plants.
Bobbink & Atkins, Rutherford, N. J., 469 rose plants in 87 varieties.
Bonney, Mrs. Nelson P., Norwich, N. Y., 10 cuttings of *Cornus alba argenteo-marginata*.
Bullard, Mr. Howard O., Hackensack, N. J., 64 plants of cacti and succulents.

Conard Pyle Co., West Grove, Pa., 100 *Rosa multiflora japonica.*
Craig, Mr. Wm. N., Waymouth, Mass., 4 *Anemone vernalis.*
Dreer, Mr. H. A., Philadelphia, Pa., 214 roses in two varieties.
Eldridge, Mrs. Roswell, Great Neck, L. I., 65 begonia plants in 37 species.
Fitzhugh, Mr. Edward J., Jamaica, N. Y., 1 *Apios tuberosa* from Maine.
Force, Mrs. John W., Rochester, N. Y., 5 plants of *Pelargonium.*
Grafing, Mr. H., Brooklyn, N. Y., 1 *Prunus persica atropurpurea.*
Gregory, Miss E. C., Brooklyn, N. Y., 1 *Eriobotrya japonica.*
Harper, Dr. R. A., Ridgewood, N. J., 1 clump of *Viola sororia.*
Hay, Mr. Clarence L., New York, N. Y., 1 *Mimulus primuloides.*
Hayward, Mr. Wyndham, Lakemont Gardens, Winter Park, Fla., 51 bulbs of *Zephyranthes, Watsonia, Nerine.*
Hecht, Miss Sadie, New York, N. Y., 1 *Ilex crenata* var. *convexa.*
Hicks' Nurseries, Westbury, L. I., 32 plants, being 6 species of woody plants.
Hires, Miss Clara S., Millburn, N. J., 1 *Polypodium aureum* growing without soil in sealed glass container.
Husson, Miss J., Cragsmoor, N. Y., 215 bulbs *Narcissus poeticus plenus.*
Ihrig, Mr. Paul, Brooklyn, N. Y., 216 plants, comprising 8 species or varieties of paeonies.
Lewis, Mr. Clarence, Sterlington, N. Y., 6 bulbs *Narcissus viridiflorus.*
Loines, Miss Hilda, Brooklyn, N. Y., 100 scions of sugar maple and beech.
Longobardi, Miss Theresa, Brooklyn, N. Y., 1 *Opuntia monacantha.*
Manda, Mr. Walter, South Orange, N. J., 28 plants in 25 species.
New York State Federated Garden Clubs (Mrs. Wm. C. Meissner), 5 species of *Sedum.*
New York Zoological Park, New York, N. Y., 2 *Carica Papaya.*
Palmborg, Miss E. V., Brooklyn, N. Y., 3 seedlings *Pinus radiata.*
Peters, Mrs. W. Sterling, East Hampton, L. I., 3 species of *Hosta.*
Prince, Mrs. J., New Rochelle, N. Y., 1 *Hypericum calycinum.*
Rittersberger, Mr. Henry, Brooklyn, N. Y., 1 *Oxalis tetraphylla.*
Rixford, Dr. Emmet, Los Altos, Cal., 4 varieties of *Rosa.*
Romanoffsky, Mr. & Mrs., New York, N. Y., 1 *Magnolia macrophylla.*
Rosenfelt, Mrs. Henry H., Cedarhurst, L. I., 42 plants culinary herbs.
Scheepers, John, Inc., 522 Fifth Ave., New York, N. Y., 300 Tulip bulbs in 12 varieties.
Smith, Miss Marjorie, Brooklyn, N. Y., 1 *Epigaea repens.*
Taylor, Miss Venetia, Valley Stream, L. I., 1 *Gentiana Saponaria.*
Traendley, Mr. Charles A. and Mr. John H., New York, N. Y., 150 plants of *Rosa* "Mrs. F. D. Roosevelt."
Tricker, Wm., Inc., Saddle River, N. J., 45 varieties of water lilies.
Williams, Mr. H. S., New York, N. Y., 2 plants.

Seed Packets

Berry, Rev. Arthur D. (2)
Biles, Mrs. Luther (1)
Brown, Mrs. G. Stewart (1)
De Navarro, Mr. J. M. (3)
English, Mr. Carl S., Jr. (123)
Garden Club of America (4)
Hayward, Mr. Wyndham (2)
Heron, Mr. James H. (1)

Phanerogamic Herbarium

Beals, Mr. A. T., Elmhurst, L. I., 3 *Calamagrostis epigeios* from a juniper swamp on Long Island.

Carnegie Museum, Pittsburgh, 11 specimens of *Eleocharis* from the Uinta Basin.

Chisholm, Mrs. Maude L., Proctor, Vermont, 1 *Camptosorus rhizophyllus* var. *Boycei* and two photographs of ferns in habitat.

Correll, Mr. Donovan S., Duke University, Durham, N. C., 17 specimens of *Orchidaceae* from North Carolina.

Dickinson, Miss Louise, North Amherst, Mass., 83 specimens from Colorado, Idaho and Utah.

Drushel, Dr. J. A., New York University, 103 specimens collected by Dr. Drushel in the eastern and southern United States.

Hanmer, Mr. C. C., East Hartford, Conn., 200 specimens collected by Mr. Hanmer on Fisher's Island.

Hinton, Mr. George B., Mexico City, three sample sheets of *Rubiaceae* collected by Mr. Hinton in Mexico.

Jannson, Mr. K. P. Groton, Conn., 10 type collections of *Rubus*.

Jones, Mrs. Wallace T., Brooklyn, N. Y., 5 fruits of Mangosteen, Nutmeg and Mace.

Palmborg, Miss E. V., New York, N. Y., 3 specimens of *Pinus radiata*.

Petersen, Miss Grace A., Woodhaven, L. I., 1 *Cryptogramma Stelleri*.

Scully, Dr. Francis J., Hot Springs, Ark., 26 ferns and lycopods.

Whitehead, Mr. J., University of Michigan, Ann Arbor, 24 ferns.

For the Department of Elementary Instruction

Blatt, Miss Natalie, $2.00 for the children's clubroom library.

Boys and Girls Club, $25.00 for the Endowment Fund for Children's Work.

Butler, Mrs. Glentworth R., One subscription to the Nature Magazine for the children's clubroom library. One prize cup competed for by the girls in the outdoor garden.

Gager, Dr. C. Stuart, One book for the children's clubroom library.

Garden Center Institute of Buffalo (through Mrs. Edward B. Holmes) $25.00 for the children's work.

Garden Teachers' Association, One prize cup competed for by the boys of the outdoor garden.

Goodman, Mr. and Mrs. Joseph, One cup competed for by the boys in the outdoor garden. Three dozen calendars for use in children's classwork.

Haggerty, Miss Isabel, One pamphlet for the children's clubroom library.

Hammond, Miss Elsie, Twenty-one hand-colored photographs of wild flowers for use in classwork.

Karshan, Miss Gloria and Master Donald, One book for the children's clubroom library.

Levine, Miss Roberta and Master Martin, $2.00 for the children's clubroom library.

Loines, Miss Hilda, $25.00 for the children's work. Specimens of fruits and leaves for use in classwork.
Longmans, Green, Publishers, One book for the children's garden library.
Miner, Miss Frances M., One book for the children's garden library.
New York University Class (The Teaching of Elementary Science), Two books for the children's clubroom library.
Oakes, Miss Fannie, seeds of Mariposa lilies.
Perkins, Mrs. Charles E., $25.00 honorarium for children's garden work.
Pratt, Mr. Robertson, $25.00 for the children's work.
Prospect Nature Club of Maplewood (N. J.), Gourd plants and seed for the children's garden.
Public School 117, Queens, Parent-Teachers Association, $10.00 for the children's clubroom library.
Rabinowitz, Mrs. Louis, Twenty-five calendars for use in children's classwork.
Raymond, Mrs. Ralph, Six plants in three varieties for the children's work.
Sanders, Miss Claire, One book for the children's clubroom library.
Shanahan, Mrs. Thomas E. J., One book for the children's garden library.
Shaw, Miss Ellen Eddy, Three gold honor pins for service in the outdoor garden.
Sherman, Master Julius, $1.00 for the children's clubroom library.
Smalley, Master Melvin, $5.00 for the children's clubroom library.
Star, Mr. C., Twenty-seven uncolored slides for use in children's classwork.

Miscellaneous

Mr. Henri Bernhey, Brooklyn, 16 photographs taken in Brooklyn Botanic Garden.
British Museum, London, England, 1 photograph of *Helonias laeta* Ait.
Mr. A. M. Elmer, Brooklyn, 11 angle irons.
Mr. Jack Flodin, Brooklyn, 2 photographs taken in Brooklyn Botanic Garden.
Mrs. Walter P. Long, Brooklyn, 62 paintings of fleshy fungi.
Park Department, Brooklyn, 100 loads of leaves.
Mrs. Belle Storrs, Brooklyn, 1 cape made of dried flowers of *Eriophorum*.
Miss Grace Tainter, Brooklyn, 2 sets of "Herb Garden" postcards.
Woman's Auxiliary, Brooklyn Botanic Garden, 1 gross glass punch cups, 1 warming oven, 275 blue cups and saucers.

APPENDIX 2

PUBLICATIONS BY THE BOTANIC GARDEN PERSONNEL DURING 1936

Averill, Mary

Flower Arranging. *Garden Dictionary*. Pp. 261–264. March.
Japanese Gardens. *Garden Dictionary*. Pp. 402–404. March.

Benedict, Ralph C.

Report of the editors for 1935. *Amer. Fern Jour.* **26**: 35. January–March.

Hunting Fern Hybrids near Newton. *Amer. Fern Jour.* **26**: 36. January–March.

Review of American Genetics Texts. *The Teaching Biologist* **5**: 92–94. February.

Report of the Resident Investigator (Ferns) for 1935. *Brooklyn Bot. Gard. Record* **25**: 130–133. April.

Catalogue of Hardy Ferns. *Amer. Fern Jour.* **26**: 74. April–June.

Well-Curbs as Fern Gardens. *Amer. Fern Jour.* **26**: 4. October–December.

A Field Trip to the New York Zoological Park. *The Teaching Biologist* **6**: 42. December.

Caparn, Harold A.

Flower Garden. *Garden Dictionary.* Pp. 264–265. March.

The following articles have appeared in *Arts and Decoration:*

Study this chart if you are planning a perennial border. P. 29. April.

Making your own rock garden. P. 35. April.

Through one summer. The Annual Garden. P. 38. May.

The essential shrubbery border. P. 39. May.

A foundation for a water garden. P. 32. June.

Hot weather gardens. P. 33. August.

The passing and grouping of evergreens. P. 36. September.

Planting bulbs for next spring's gardens. P. 40. October.

Cheney, R. H.

Reaction time behavior after caffeine and coffee consumption. *Journal Exper. Psychol.* **XIX**[3]: 357–369. June.

Conklin, Marie E.

Studies of the root nodule organisms of certain wild legumes. *Soil Science* **41**: 167–185. March.

Doney, Charles F.

Descriptions of many species and varieties of wood plants. *The Garden Dictionary. Seriatim.* March.

Free, Montague

The Brooklyn Botanic Garden exhibit of rock garden plants at the Twenty-third International Flower Show, March 16–21. Brooklyn Botanic Garden. *Leaflets* **XIV**[1]. March 14.

Plant propagation. *Catalog of The Twenty-third International Flower Show.* Pp. 136–137.

Michaelmas Daisy. *Garden Dictionary.* P. 495. March.

Rock Garden. *Garden Dictionary.* Pp. 679–688. March.

Report of the Horticulturist and Head Gardener for 1935. *Brooklyn Botanic Garden Record* **25**: 115–123. April.

Brooklyn Botanic Garden's exhibit of rock garden plants. *Gardeners Chronicle of America* **40**: 157–158. May.

Making the water garden. *The Sun* (New York). September 12.

Summer pruning. *Gardeners Chronicle of America* **40**: 200. July.

You must have peonies. *The Sun* (New York). September 12.

Plant jewelled shrubs. *Better Homes & Gardens.* P. 44. October.

Planting trees and shrubs. *The Sun* (New York). October 10.

Gager, C. Stuart

The economic and cultural value of botanical research. (Abstract of address given at the Brooklyn Polytechnic Institute Assembly, Dec. 4, 1935.) *Poly. Men.* **12**: 3. Dec. 1935.

Twenty-fifth annual report of the Brooklyn Botanic Garden, 1935: Report of the Director. *Brooklyn Bot. Gard. Record* **25**: 11–45. April.

The effects of radium rays on plants; a brief résumé of the more important papers from 1901 to 1932. *Biological effects of radiation.* B. M. Duggar, Editor **2**: (Chap. XXX), 987–1013. Reprinted as *Brooklyn Bot. Gard. Contributions*, No. 74.

Gardens within a garden. *Discovery* **17**: 84–86. March.

Medicinal plant garden of the Brooklyn, N. Y. Botanic Garden. *American Interne* **1**: 14. January.

The School of horticulture in perspective. (Address delivered at the twenty-fifth anniversary exercises of the School of Horticulture for Women, Ambler, Pa., May 20, 1936.) *Science* **84**: 357–365. Oct. 23.

Graves, Arthur Harmount

Botany. Revision service (for 1935). *Collier's National Encyclopedia*, pp. 17–18. April.

Forest Pathology. Chestnut breeding work in 1935. *Brooklyn Bot. Gard. Record* **25**: 62–75. April.

Report of the Curator of Public Instruction for 1935. *Brooklyn Bot. Gard. Record* **25**: 78–91. April.

40 newspaper articles relating to the Brooklyn Botanic Garden.

Breeding disease-resistant chestnut trees. *Abstracts of papers presented at the meeting of the American Phytopathological Society, Atlantic City, New Jersey, December 28–31, 1936.* Pp. 9, 10. December.

Gundersen, Alfred

Report of the Curator of Plants for 1935. *Brooklyn Bot. Gard. Record* **25**: 99–104. April.

Miner, Frances M.

The following 16 articles appeared in *The Herald Tribune* (New York) on the dates indicated:

Vegetables—Our heritage. March 29.
Early summer vegetables. April 5.
Early spring weeds. April 12.
Seeds. April 19.
A yellow flower garden for summer. April 26.
Preparing the ground for a garden. May 10.
Transplanting seedlings. May 17.
Thinning seedlings and cultivating the garden. June 7.
Garden insects. June 14.
Green leaves. June 21.
Plans for fall vegetables. June 28.
Collecting vegetable seeds. July 5.
Perennials. July 12.

Flower forms and floral parts. July 19.
Bulbs for winter bloom. November 8.
Nuts and nut-bearing trees. December 6.

Reed, George M.

Notes on rust diseases of Sempervivum and other ornamentals in the New York area. *Jour. N. Y. Bot. Gard.* **37:** 54–59. March. (Authors B. O. Dodge and G. M. Reed.)

Plant Pathology. *Brooklyn Bot. Gard. Record* **25:** 45–59. April.

The Iris. *Brooklyn Bot. Gard. Record* **25:** 59–62. April.

Report on the influence of the growth of the host on smut development. *Miscellanea* (Amer. Philosophical Soc.) **1:** 43–46.

Hybrids of Iris laevigata with I. veriscolor and I. virginica. *Amer. Iris Soc. Bull.* **62:** 10–17. June.

Kotaka-yen, Horikiri, Japan, preserved as a famous scene. *Amer. Iris Soc. Bull.* **62:** 37–39. June.

The Japanese Iris and its classification. *Flower Grower* **23:** 358, 359. July.

Three articles appeared in *The Sun* (New York) on Iris and Crabapple.

Reed, George M., and T. R. Stanton

Reaction of oat varieties to physiologic races of loose and covered smuts of red oats. *Jour. Agr. Res.* **52:** 1–15. January.

Shaw, Ellen Eddy

Report of the Curator of Elementary Instruction. *Brooklyn Bot. Gard. Record* **25:** 91–99. April.

The city backyard. *Brooklyn Daily Eagle.* May 3.

The following 39 articles appeared in *The Sun* (New York) on the dates indicated:

Novelties among the seeds. February 8.
Complete the seed order. February 15.
Gardens for boys and girls. February 22.
Annuals of easy culture. February 29.
Choosing seed for fall bloom. March 7.
Vines for garden background. March 14.

Choosing good roses for the garden. March 21.
Rose culture. March 28.
The garden's green carpet. April 4.
Strawberries. April 11.
Fragrance in the garden. April 18.
The herb garden for beginners. April 25.
Dahlias and gladiolus. May 2.
Garden pests. May 9.
Gourds. Care of the garden. May 16.
Still time to make a garden. May 23.
Your lawn needs looking after. May 29.
Garden fun for boys and girls. June 10.
Tuberous begonias for the shade. June 13.
Mid-June care of the garden. June 20.
Sowing seed for next year's bloom. June 27.
Red flowers for the garden. July 4.
Garden troubles. July 11.
Garden shrubs: their care. July 18.
Evergreens for foundation planting. July 25.
Midsummer in the vegetable garden. August 1.
Midsummer in the flower garden. August 8.
Weeds and their control. August 15.
Make out the bulb order. August 22.
Garden color schemes for next year. August 29.
Fall care of the lawn. September 5.
What to plant in the fall. September 12.
Small trees for ornamental effects: what to order. September 19.
How to prepare and plant the bulb bed. September 26.
Taking up the house plants. October 3.
Lilies for the summer garden. October 10.
What to cut in the garden for winter bouquets. October 21.
Fall planting of roses. October 24.
What plants should be protected for the winter? October 31.

Svenson, Henry K.

Report of the Curator of the Herbarium for 1935. *Brooklyn Bot. Gard. Record* **25**: 105–113. April.

The Early Vegetation of Long Island (A Long Island Tercentenary publication). *Brooklyn Bot. Gard. Record* **25**: 207–227. July.

Svenson, Henry K., and H. Uittien

Sedges of the Fiji Islands. *Bernice P. Bishop Museum Bull.* **141**: 15–16. 1936.

APPENDIX 3

TALKS, LECTURES, ADDRESSES, AND PAPERS GIVEN BY THE BOTANIC GARDEN PERSONNEL DURING 1936

By the Director:

January 20. *Brooklyn Botanic Garden and the public.* Brooklyn Midday Club. Bedford Y. M. C. A.

March 11. *Science and religion: How to think about it.* The University in the Church. First Presbyterian Church. Brooklyn.

March 19. *The commercial importance of botany.* Rotary Club. Hotel Bossert, Brooklyn.

March 24. *Brooklyn Botanic Garden and horticulture.* Pennsylvania Horticultural Society. Penn. Athletic Club. Philadelphia.

April 1. *Brooklyn Botanic Garden and the Long Island Tercentenary.* L. I. Tercentenary Comm. Borough Hall, Brooklyn.

May 20. *The School of Horticulture in perspective.* Twenty-fifth Anniversary Address. School of Horticulture for Women. Ambler, Pa.

October 31. *Botanic Gardens in science and education.* Founders' Day Address. Swarthmore College, Swarthmore, Pa.

December 9. *Greetings to Long Island University from Brooklyn Botanic Garden.* L. I. University, Tenth Anniversay Exercises. Brooklyn.

By the Curator of Public Instruction:

February 28. *Plant propagation.* Classes from Girls' Commercial High School. 3 talks. At the Garden.

March 4. *Breeding the American chestnut.* Brooklyn Institute, Dept. of Education, Dept. of Botany. At the Garden.

March 5. *Variation.* Biology Club of Alexander Hamilton H. S. At the Garden.

April 28. *Opportunities in the profession of forestry. Breeding the chestnut tree.* Biology Club, Boys' High School.

April 30. *Introductory remarks.* Lecture by Dr. R. P. Wodehouse on pollen grains. Brooklyn Institute of Arts and Sciences, Dept. of Education.

May 2. *Arbor Day and forestry.* 2 talks. Alexander Hamilton H. S.

July 7. *Our native trees.* Asharoken Garden Club. Northport, L. I.

September 13. *Remarks at the dedication of a white fir (Abies concolor) to the late Everett Philo Martin.* Kissena Park, Flushing.

October 22. *Breeding the chestnut.* "Natura" Club of Erasmus Hall H. S. At the Garden.

November 12. *Grafting.* Class from Alexander Hamilton H. S. At the Garden.

December 1. *Breeding new chestnut trees.* Torrey Botanical Club. At American Museum of Natural History.

December 5. *Chestnut breeding.* Boys and Girls Club of B. B. G. At the Garden.

December 8. *Forestry and conservation.* Julia Richman H. S. Annex.

December 29. *Breeding disease-resistant chestnut trees.* Annual meeting of American Phytopathological Society. Atlantic City, N. J.

By the Curator of Elementary Instruction:

January 13. *Nature study for the first, second, and third grades.* Board of Education, East Orange, N. J.

January 16. *Work for boys and girls at the Brooklyn Botanic Garden.* The Brooklyn Committee on Youth Week. At the Garden.

January 27. *Graduation address.* P. S. 197.

January 29. *Graduation address.* P. S. 242.

January 29. *Graduation address.* Girls' High School.

February 1. *Testimonial to Miss Elsie R. Kane, Principal of P. S. 241.* Testimonial Luncheon to Miss Kane at the Waldorf-Astoria.

February 5. *The work of the Department of Elementary Instruction.* Woman's Auxiliary of the Brooklyn Botanic Garden. At the Garden.

February 10. *Nature study for the fourth, fifth, and sixth grades.* Board of Education, East Orange, N. J.

February 13. *Nature activities at the Brooklyn Botanic Garden.* New York Chapter, American Nature Study Society. At the Garden.

March 2. *Nature study for the first, second, and third grades.* Board of Education, East Orange, N. J.

March 9. *Gardening for children.* Queensboro Kindergarten Teachers Association, Jamaica, N. Y.

March 27. *Our spring wild flowers.* Two assemblies, P. S. 156.

April 1. *Building through nature.* Parent-Teacher Association, George Washington School, West Hempstead, L. I., N. Y.

April 13. *Nature study for the fourth, fifth, and sixth grades.* Board of Education, East Orange, N. J.

April 27. *Hobbies for boys and girls.* Brooklyn Court of Honor, Boys' and Girls' Week, Brooklyn Children's Museum.

April 29. *What a botanic garden means to the community.* Association for Childhood Education, Hotel Pennsylvania.

April 30. *Nature study for teachers.* Third Annual Nature Curator Conference, American Museum of Natural History.

May 2. *Nature study in cooperation with a botanic garden.* New York School Principals' Association, Waldorf-Astoria Hotel.

May 4. *The work of the Brooklyn Botanic Garden.* Mothers' Club, P. S. 241. At the Garden.

May 8. *Gardens for boys and girls.* P. S. 104, Bronx.

May 11. *Gardening for juniors.* Junior Garden Club Council, The Herald Tribune, New York.

May 13. *The Brooklyn Botanic Garden.* Women's League, Ocean Avenue Congregational Church.

May 13. *The Brooklyn Botanic Garden.* Brooklyn Assistant to Principals' Association. At the Garden.

May 13. *Educational activities of the Brooklyn Botanic Garden.* Brooklyn Section, Public School Kindergarten Association. At the Garden.

May 14. *The Brooklyn Botanic Garden.* Boys' High School, Waverly Annex.

May 20. *The Brooklyn Botanic Garden.* Garden Department, Woman's Club of Hollis Presbyterian Church. At the Garden.

June 2. *The Brooklyn Botanic Garden.* Junior H. S. 151.

June 3. *Children's exhibits.* Long Island Flower Show, Great Neck, L I., N. Y.

June 5. *The Brooklyn Botanic Garden.* P. S. 5.

June 10. *Children's work at the Brooklyn Botanic Garden.* Radio Garden Club Field Day. At the Garden.

June 24. *Graduation address.* P. S. 77, Queens.

June 25. *Graduation address.* P. S. 242.

September 22. *Plant propagation.* Garden Club of Brewster, N. Y.

September 29. *Children's gardens.* Brooklyn Home for Consumptives.

October 7. *Plant propagation.* Community Garden Club of Marlborough, N. Y.

October 10. *Junior garden work.* Rochester Garden Club, Rochester, N. Y.

October 13. *Junior garden work.* Garden Center Institute of Buffalo, N. Y.

October 14. *Junior garden work.* Skaneateles Garden Club, Skaneateles, N. Y.

October 20. *The Brooklyn Botanic Garden, a beauty spot.* Julia Richman High School.

October 21. *Plants for classroom use.* Class from American Museum of Natural History. At the Garden.

October 29. *The Brooklyn Botanic Garden.* P. S. 145.

November 4. *Plant propagation.* Garden Club of Greenwich, Conn.

November 5. *House plants.* Garden Club of Englewood, N. J.
November 9. *Wild flowers.* P. S. 91.
November 12. *Round table on elementary nature study.* New York Chapter, American Nature Study Society, American Museum of Natural History.
November 19. *Thanksgiving.* Parent-Teacher Association, P. S. 155, Queens.
December 21. *Christmas myths and legends.* Two assemblies, Junior H. S. 151.
December 22. *Christmas.* P. S. 4.

By Instructors:

Miss Hammond:

January 28. *Preparation and care of the small garden.* Mothers' Club, P. S. 236.
April 27. *Spring in the Brooklyn Botanic Garden.* Pilgrim League, Flatbush Congregational Church.
April 30. *The Brooklyn Botanic Garden.* Mothers' Club, P. S. 140. At the Garden.

Miss Miner:

February 13. *The children's garden at the Brooklyn Botanic Garden.* New York Chapter, American Nature Study Society. At the Garden.
April 3. *Classroom gardening.* New York Society for Experimental Study of Education.
April 6. *Children's gardening.* Woodhull Day School, Hollis, L. I., N. Y.
October 26. *Trees.* P. S. 91.

By the Curator of Plant Pathology:

February 6. *The gardens of Japan.* Annual Dinner, Reformed Dutch Church of Flatbush. Brooklyn.
April 27. *Iris.* Woodmere Garden Club. At the Garden.
May 6. *Plant Breeding.* Class from Brothers College of Drew University. At the Garden.
May 8. *Japanese Gardens.* Associate Alumnae of Adelphi Academy. At the Garden.

By the Curator of Plants:

February 4. *The Structure and Evolution of Flowers.* With drawings by Maud H. Purdy. Torrey Botanical Club, Amer. Mus. Nat. Hist.

February 24. *Saugerties Fossils.* With drawings by Maud H. Purdy. Monday Club. Saugerties, N. Y.

May 28. *Plant-Animal Interdependence in Evolution.* Brooklyn Nature Club. At the Garden.

December 31. *Placentation and the classification of Dicotyledons.* Botanical Society of America, Systematic Section. Atlantic City, N. J.

By the Curator of the Herbarium:

May 29. *Plants of Long Island.* Children's Library, Westbury, L. I.

August 18. *Vegetation of Long Island.* L. I. Biological Laboratory. Cold Spring Harbor, L. I.

November 17. *The Galapagos Islands.* Nature Clubs of Union County, N. J. Plainfield, N. J.

December 30. *Flora of Middle Tennessee.* Botanical Society of America. Atlantic City, N. J.

By the Horticulturist:

January 3. *Small Pools.* Garden Department of Woman's Club of Greenwich, Connecticut.

January 7. *Question Box.* Garden Club Federation of Massachusetts. Boston.

January 7. *Horticultural Projects for Garden Clubs.* Garden Club Federation of Massachusetts. Boston.

February 7. *Rock Gardening.* Missouri Horticultural Society. St. Louis.

May 1. *Presidential Address.* American Rock Garden Society, Annual Meeting. Boston.

June 9. *Plant Propagation.* Philadelphia Garden Clubs, Strawberry Mansion, Fairmount Park.

June 10. *The Rose Garden.* Radio Garden Club Field Day. At the Garden.

June 18. *Plant Propagation.* Ft. Orange Garden Club. Albany, New York.

June 24. *Plant Propagation.* Southampton (L. I.) Garden Club.

August 12. *Plant Propagation.* New Canaan (Con.) Garden Club.

October 6. *Some Thoughts on Rose Growing.* Fall Rose Garden Day. At the Garden.

October 26. *Plants for House Culture.* Rochester Garden Club. Rochester, New York.

October 26. *Plant Propagation.* Joint meeting of the Garden Lovers Club, The Home Acres Club, and the Flower City Garden Club. Rochester.

December 1. *House Plants.* Society of Lying-In-Hospital. New York City.

December 16. *Plants for Rock Gardens.* Horticultural Society of New York.

By the Curatorial Assistant (Charles F. Doney):

Shrubs for Long Island Gardens. Woodmere Garden Club. Woodmere, L. I.

By the Resident Investigator (Ferns):

May 23. *Fern Miscellany.* Evening lecture, during field trip, to American Fern Society, Torrey Botanical Club, and New York Association of Biology Teachers.

By the Resident Investigator (Economic Plants):

October 30. *Comparative Pharmacology of Caffeine and Coffee.* Biology Seminar, Princeton University, Princeton, New Jersey.

By the Custodian:

October 7. *Nature in the Autumn.* Woman's Benevolent Society, Marcy Avenue Baptist Church.

October 22. *Decorative Fruits of Autumn.* Brooklyn Nature Club.

By the Field Secretary:

February 11. *The Brooklyn Botanic Garden and its activities.* Wellesley Club of Brooklyn. Visiting Nurses Association Auditorium.

February 13. *Japanese Flower Arrangement.* Queens Teachers Association. Jamaica.

February 20. *Table Arrangement.* Maplewood Woman's Club. Maplewood, N. J.

February 20. *Dish Gardens.* Evening talk. Mothers' Club. Central Congregational Church.

February 24. *Japanese Garden.* Forum meeting. Officers of the 7th and 8th District Clubs of New Jersey. Newark, N. J.

February 27. *Use of color for flower arrangement.* Queens Teachers Association. Jamaica.

March 12. *Period arrangements.* Queens Teachers Association. Jamaica.

March 20. *Children's Garden.* Garden Department of Bayside Woman's Club. Bayside, L. I.

March 25. *Activities of Brooklyn Botanic Garden.* Contemporary Club. Newark, N. J.

March 26. *Table arrangements.* Queens Teachers Association. Jamaica.

April 2. *Criticism of flower arrangements.* Queens Teachers Association. Jamaica.

April 15. *Brooklyn Botanic Garden and its activities.* Flatbush School, Mothers' Club. At the Garden.

May 6. *Brooklyn Botanic Garden and its activities.* Friendly Tourist Club. At the Garden.

May 11. *Flower Arrangement.* Flatbush Y. M. C. A. Mothers' Club. At the Flatbush Y. M. C. A.

May 25. *New Additions to the Botanic Garden.* Monday Culture Charity Club. At the Garden.

June 2. *Brooklyn Botanic Garden.* Sussex Garden Club. At the Garden.

June 5. *Brooklyn Botanic Garden.* Garden Department of the Hollis Woman's Club. Hollis, L. I.

June 11. *Judging.* Woodmere Garden Club. Woodmere, L. I.

July 20. *Brooklyn Botanic Garden.* Bay Ridge Garden Club. Bay Ridge.

September 9. *Judging flower arrangements.* Federal Reserve Club. New York City.

November 10. *Flower arrangement.* Business Woman's Club. Central Congregational Church.

APPENDIX 4

RADIO TALKS BY THE BOTANIC GARDEN PERSONNEL DURING 1936

By the Curator of Public Instruction:

From Station WNYC:

January 30. What to see in the conservatories of the Brooklyn Botanic Garden.
March 12. The care of cut flowers.
April 23. Spring flowers at the Brooklyn Botanic Garden.
June 4. What to see now at the Brooklyn Botanic Garden.
November 14. The spreading chestnut tree.
November 19. Making a new chestnut tree.
December 31. Abroad at home.

From Station WMCA:

March 19. The exhibit of rock garden plants of the Brooklyn Botanic Garden at the International Flower Show.

By the Curator of Elementary Instruction:

From Station WMCA:

January 3. The work of the Brooklyn Botanic Garden.

From Station WNYC:

January 2. The care of Christmas plants.
February 13. Seeds to choose for 1936.
March 26. What to plant in city backyards.
June 25. Summer nature work for boys and girls.
October 22. Bulbs for indoor bloom.
December 3. Children's nature work for Christmas.

From Station WOR:

February 25. New annuals for 1936.
May 15. The training of junior gardeners.
November 24. Winter gardens for young folks.

By Instructor (Miss Miner):

From Station WNYC:

May 7. Starting the children's garden.

From Station WOR:

June 23. Educational values in the children's garden.

By the Horticulturist:

From Station WOR:

January 14. House plants in water.
March 10. Pruning your roses.
March 16. The Brooklyn Botanic Garden exhibit at the International Flower Show, New York City.
April 24. Puttering with perennials.
July 17. A perennial garden from seeds.
August 11. The story of the waterlily.
October 23. Cuttings made at home.
December 22. The holly and the ivy.

From Station WNYC:

January 16. Fun with house plants.
February 27. Garden fertilizers.
April 9. The story of the tulip.
May 21. Garden chores in May.
December 17. The story of the Christmas plants.

By Curatorial Assistant (Charles F. Doney):

From Station WNYC:

November 5. Shrubs for autumn gardens.

From Station WOR:

September 18. Shrubs beautiful in the fall.
December 8. Let your Christmas tree live!

By the Honorary Curator, Japanese Gardening (Mary Averill):

From Station WOR:

November 10. Landscape miniatures.

APPENDIX 5

FIELD TRIPS CONDUCTED, 1936

By the Curator of Public Instruction:

March 28. Torrey Botanical Club. Fort Tryon Park, Manhattan.

September 13. Torrey Botanical Club. Anthony's Nose, N. Y.

By the Curator of Plants:

May 15. New York Vegetarian Society, Palisades, N. J.

July 3–6. Torrey Botanical Club to Overlook and High Peak in the Catskill Mountains. Maplecrest, N. Y.

By the Curator of the Herbarium:

May 16. New York Assoc. Biology Teachers. Jones Beach, L. I.

May 22–24. Joint meeting of the Torrey Botanical Club, the American Fern Society and the New York Assoc. Biology Teachers. Branchville, N. J. (With Dr. R. C. Benedict and Mr. G. T. Hastings.)

September 27. American Fern Society. Springdale, N. J. (With Dr. R. C. Benedict.)

By the Resident Investigator (Ferns):

May 22–24. American Fern Society, Torrey Botanical Club, and New York Association of Biology Teachers. Branchville, N. J.

September 27. American Fern Society, Torrey Botanical Club. Springdale, N. J.

By Instructor (Hester M. Rusk):

April 25. Torrey Botanical Club. Brooklyn Botanic Garden.

June 20. Torrey Botanical Club. Englewood Cliffs, N. J.

By Curatorial Assistant (Hilda Vilkomerson):

May 3. Torrey Botanical Club. Inwood Park, Manhattan.

APPENDIX 6

ORGANIZATION MEETINGS AT THE GARDEN, 1936

January 16. Committee on Youth.
February 13. New York Chapter, Nature Study Society.
March 4. Department of Botany, Brooklyn Institute of Arts and Sciences.
March 17. Conference on Junior Garden Work.
April 1. Department of Botany, Brooklyn Institute of Arts and Sciences.
April 15. Flatbush School Parent Association.
April 16. Orange (New Jersey) Woman's Club.
April 17. Woman's Auxiliary, Brooklyn Botanic Garden.
April 23. Contemporary Club.
April 27. Woodmere Garden Club.
May 1. Torrey Botanical Club.
May 2. Reconciliation Tours.
May 4. Mothers' Club, P. S. 241.
May 6. Drew Theological Seminary.
May 6. Women of '76 Chapter D. A. R.
May 6. Friendly Tourist Club.
May 7. Marine Park Garden Club.
May 7. Montclair group.
May 8. Flatbush Y. M. C. A. Mothers' Club.
May 8. Associate Alumnae of Adelphi Academy.
May 13. Brooklyn Section New York Kindergarten Association.
May 13. Assistant Principals' Association of Brooklyn.
May 14. Far Rockaway Women's Club.
May 14. Rembrandt Club.
May 20. Hollis Garden Club.
May 21. American Nature Study Society, New York Chapter.
May 23. Bird Lover's Club of Brooklyn.
May 25. Monday Culture Charity Club.
May 25. Froebel League Society.
May 28. Brooklyn Nature Club.
May 29. Brookside, Church and Nearpass P. S., Sussex County, New Jersey.
June 2. Sussex (New Jersey) Garden Club.

June 5. Hollis Woman's Club, Garden Department.
June 10. Radio Garden Club Field Day.
October 13. Department of Botany, Brooklyn Institute of Arts and Sciences.

	1932	1933	1934	1935	1936
Number of organizations ...	59	49	48	31	35
Total attendance	2,741	3,357	1,906	839	1,289

APPENDIX 7

REPORT ON PHOTOGRAPHIC WORK

Negatives on file December 31, 1935		8,894
Negatives accessioned during 1936		412
Total negatives on file December 31, 1936		9,306
Lantern slides on file December 31, 1935		6,248
Lantern slides accessioned during 1936		263
Total lantern slides on file December 31, 1936		6,511
Prints on file December 31, 1935		6,270
Prints made during 1936	1,961	
Used or distributed	1,249	
Prints filed during 1936		712
Total prints on file December 31, 1936		6,982
Enlargements made		52

Respectfully submitted,

FRANK STOLL,
Registrar and Custodian

APPENDIX 8

REPORT ON BROOKLYN BOTANIC GARDEN PUBLICATIONS, 1936

Ecology

Official Organ of the Ecological Society of America

Quarterly. Volume XVII comprised 45 papers (besides reviews, proceedings, and miscellaneous matter), 714 pages and 185 text figures (as against 51 papers, 680 pages and 175 text figures in 1935). The circulation at the close of the fiscal year (November 30, 1936) was 1,086 as against 1,009 one year ago.

The annual budget was $5,773.81, the credit balance $448.49, and assets over liabilities $601.34 (as against $6,364.34, $1,229.22, and $1,368.21 assets over liabilities in 1935), plus the value of back sets and volumes on hand. Dr. Henry K. Svenson continued on the editorial board as the Brooklyn Botanic Garden representative. Prof. Alfred E. Emerson and Prof. George D. Fuller, both of the University of Chicago, continued as Editors.

Genetics

In Co-operation with the Editorial Board of Genetics

Bimonthly. Volume XXI comprised 44 papers, 855 pages, 5 plates, and 152 text figures (as against 39 papers, 604 pages, 4 plates, and 215 text figures in 1935). At the close of the fiscal year (November 30, 1936) the circulation was 726, the annual budget $10,586.16, and the credit balance $3,647.13 (as against 701, $9,022.84, and $3,707.08 in 1935), plus the value of back sets and volumes on hand. Dr. L. C. Dunn, of Columbia University, continued as Managing Editor.

Brooklyn Botanic Garden Record

Quarterly. Volume XXV comprised 263 pages. The April number comprised the Annual Report. The circulation of the Record at the close of the year was 1,553.

Leaflets

Three single numbers and one triple number were issued. The circulation at the close of the year was 1,696.

Contributions and Memoirs

Numbers 72, 73, and 74 of the *Contributions* were published.

Memoirs, Volume IV (Pp. xiii + 133, 2 Plates), was published. This comprises the commemoration program of the 25th anniversary of the Garden, including 15 papers on twenty-five years of progress in botany and horticulture, 1910–1935.

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Membership.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, N. Y.* Telephone, Prospect 9–6173.

The Botanic Garden is open free to the public daily from 8 a.m. until dusk; on Sundays and Holidays it is open at 10 a.m.

Entrances.—On Flatbush Avenue, near Empire Boulevard and near Mt. Prospect Reservoir; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Crown Street.

To Assist Members and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden;* to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one day in advance. No parties of less than six adults will be conducted.

To Reach the Garden take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, or Tompkins Avenue trolley to Washington Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street or Vanderbilt Avenue trolley to Prospect Park Plaza and Union Street. By Automobile from points on Long Island take Eastern Parkway west and turn left at Washington Avenue; from Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway, turn left following Parkway to Washington Avenue; then turn right.

BROOKLYN BOTANIC GARDEN
PUBLICATIONS

RECORD. Established, January, 1912. An administrative periodical issued quarterly (1912–1928); bimonthly (1929–1932); quarterly (1933–). Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, announcements of courses of instruction, seed list, guides, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden. To others $1.00 a year. Circulates in 59 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Circulates in 47 countries.

Volume I. *Dedication Papers:* comprising 33 scientific papers presented at the dedication of the laboratory building and plant houses, April 19–21, 1917. 521 pages. Price $3.50, plus postage.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk: A study of grassland and forest. By Norman Taylor, June 11, 1923. 108 pages. Price $1.00, plus postage.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor, June 10, 1927. 151 pages. Price $1.60.

CONTRIBUTIONS. Established, April 1, 1911. Papers originally published in periodicals, reissued as "separates" without change of paging, and numbered consecutively. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume. Circulates in 34 countries.

No. 70. Inheritance of resistance to loose smut in hybrids of Fulghum and Black Mesdag oats. 10 pages. 1935.

No. 71. Physiologic specialization of the parasitic fungi. 19 pages. 1935.

No. 73. Studies of the root nodule organisms of certain wild legumes. 19 pages. 1936.

No. 74. The effects of radium rays on plants: Résumé of the more important papers from 1901 to 1932. 27 pages. 1936.

No. 75. Inheritance of resistance to the loose and covered kernel smuts of sorghum. I. Dwarf Yellow Milo hybrids. II. Feterita hybrids. 40 pages. 1937.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. The purpose of the *Leaflets* is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication. Issued as numbers of the RECORD; see above.

Guide No. 5. The Rock Garden. 28 illustrations. Price, 35 cents. By mail, 40 cents.

Guide No. 6. Japanese potted trees (Hachinoki). 11 illustrations. Price, 35 cents. By mail, 40 cents.

Guide No. 7. The story of our boulders: Glacial geology of the Brooklyn Botanic Garden. 22 illustrations. Price, 35 cents. By mail, 40 cents.

Guide No. 8. The story of fossil plants. 8 illustrations. Price, 35 cents. By mail, 40 cents.

SEED LIST. (*Delectus Seminum*) Established, December, 1914. Since 1925 issued each year in the January number of the RECORD. Circulation includes 160 botanic gardens and institutions located in 40 countries.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $4.00 a year. Circulates in 48 countries.

GENETICS. Established, January, 1916. Bimonthly. Subscription, $6.00 a year. Circulates in 37 countries.

BROOKLYN
BOTANIC GARDEN
RECORD

VOL. XXVI JULY, 1937 No. 3

CONTENTS

BOTANIC GARDENS OF THE WORLD
MATERIALS FOR A HISTORY

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BROOKLYN BOTANIC GARDEN RECORD

VOL. XXVI JULY, 1937 NO. 3

BOTANIC GARDENS OF THE WORLD MATERIALS FOR A HISTORY

Several years ago the writer began to collect data concerning the history, organization, and work of the botanic gardens of the world. A blank questionnaire was sent to all gardens of record. Some of these were returned with full answers to all the questions, others were given only meagre replies, and still others were never returned. This accounts in large part for the fact that the data are much fuller for some gardens than for others. Pressure of administrative duties makes it increasingly unlikely that time can be found in the very near future to make the record fuller and more accurate, and so it is offered as it is because of knowledge of increasing need of such data in the botanical world.

Botanic gardens fall roughly in one of two categories—those that are themselves institutions, and those that are only planted areas, literally "gardens," serving as adjuncts to university departments of botany or other institutions. Both kinds are here included, but the following types of living plant collections, even though some of them may be loosely designated as "botanic gardens," are not included: Nature preserves or "Wild flower sanctuaries," Memorial groves, Public parks where the trees are labelled, Flower gardens in public parks, Private collections of trees and shrubs (with a few exceptions where these collections are open to the public). For the most part this is a list of institutions, or of gardens organized primarily for botanical research or instruction or both.

The choice of "botanic" vs. "botanical" appears to be purely arbitrary, with no distinction in meaning. The use of the plural,

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"gardens," vs. "garden," is also arbitrary, but there appears to be a strong tendency on the part of the public to use the plural, especially for public institutions. This convention is a very old one extending back at least as far as the time of ancient Greece. Thus we read of the "gardens of Epicurus" (*κῆποι Ἐπικούρου*) which was really only one "garden."

The early dates of establishment of some of these institutions, still flourishing, emphasize a point the writer has made elsewhere, namely, the great momentum of botanic gardens—their tendency to persist through financial and other discouragements, political and social upheavals, and changes in the place of emphasis in botanical science. This shows that botanic gardens minister to fundamental human needs—scientific, educational, recreational, civic, and economic.

Acknowledgment should here be made of the invaluable bibliographical assistance rendered by the librarian, Mr. William E. Jordan, and staff of the Brooklyn Botanic Garden Library, and the able cooperation, especially outside of official hours, by Miss Marie Louise Hubbard, my secretary. Without these aids this report would have been much more meager and longer delayed. Grateful acknowledgment is also made of the cooperation of those who took the time to fill out and return the questionnaires and otherwise to supply information.

The writer makes no pretense that he has succeeded in making a complete list of botanic gardens, even within the limitations of the definition above implied. Nor could anyone who has compiled masses of data ever claim with confidence that there are no important omissions or inaccuracies.

It is hoped that this record may some day be of use to someone who will attempt the important and worth-while task of writing a real history of the botanic gardens of the world.

C. Stuart Gager.

Anglo Egyptian Soudan

KHARTOUM

Botanic Garden

Established: About 1918. (*Nature,* Nov. 6, 1919, p. 263.)

Argentina

BUENOS AIRES

JARDIN BOTÁNICO MUNICIPAL

Calle Sante Fé 3951 (Palermo)

Established: 1892. *Area:* 10 Hectares.
Directors: 1. Carlos Thays; 2. Benito J. Carrasco; 3. Pugonio Carrasco.

Serves as a public park. Open daily, 7 a.m. to sundown. *Library and Herbarium* (17,000 specimens. System of De Candolle). *Plantations:* Systematic, after De Candolle. 6133 species, including trees and shrubs. *Publication:* Seed List. *Lectures* are given to classes, and study collections are loaned to schools. Living matter supplied for study to local schools.

LA PLATA

JARDIN BOTÁNICO DEL FACULDAD DE AGRONOMIA DE LA UNIVERSITAD NACIONAL

Llavallol, F. C. S.

Australia

ADELAIDE

BOTANIC GARDENS OF THE UNIVERSITY

North Terrace, Adelaide, South Australia

Established: 1855. *Area:* 104 acres.
Directors:

1. George Francis (1855–1865)
2. R. Schomburgk (1865–1891)
3. M. Holtze (1891–1917)
4. J. F. Bailey (1917–1931)
5. H. Graves (Present Director; 40 years service in the Garden, last three years as Director)

Public Park: Adjoining the Garden there is a Botanic Park of 60 acres which serves as a public park. Open free daily, 7 a.m. to sunset. *Source of income:* Government grant, and rent of Kiosk. *Library:* 1000 books in public library; 500 books in office. *Herbarium:* 12,000 sheets. Arboretum and a Fruticetum. *Museum:*

Open free from 9 a.m. to 4:30 p.m. Supplies living specimens for the Botany Department of the University.

BRISBANE

Brisbane Botanic Garden

Botanic Gardens, Brisbane, Queensland, Australia

Established: 1855. *Area:* 48 acres.

Directors (Curators):

1. Walter Hill (1855–1881)
2. James Pink (1881–1886)
3. A. M. Cowan (1886–1889)
4. Phillip McMahon (1889–1905)
5. J. F. Bailey (1905–1917)
6. E. W. Bick (1917–)

Serves as a public park. Open free to the public daily from sunrise to sunset. *Source of Income:* Brisbane City Council. *Note:* In 1925 the Government transferred the Botanic Gardens and Staff to the Brisbane City Council, and made that corporation solely responsible for the financial support, but kept the Botanic Museum and the Herbarium in their control, under the direction (March, 1937) of Mr. C. T. White. *Library:* (At the Museum) 5000 volumes, plus pamphlets not indexed. *Herbarium:* 100,000 specimens. *Museum:* Open free, daily, 9–5 (Saturday, 9–12), except Sundays and public holidays. Living material for study is supplied chiefly to University of Queensland and Pharmacy College. *Affiliation:* The Garden is not affiliated with the University, but the University is adjacent to the Garden and the Technical Schools, and professors, lecturers, and students can obtain any specimens desired.

MELBOURNE

Melbourne Botanic Gardens

South Yarra, Victoria, Australia

Established: 1846. *Area:* 100 acres.

1846 *fide* reply to our questionnaire. Some publications give 1842.

Directors (Curators):

1. John Arthur (1846–1849)
2. John Dallachy (1849–1851)

3. Sir Ferdinand von Mueller (1851–1873)
4. William R. Guilfoyle (1873–1909)
5. John Cronin (1909–1923)
6. William Laidlaw (1923–1925)
7. F. J. Rae (1925–)

Serves as a public park. Open free, daily, 7 a.m. to sunset (6 mos.); 7:30 a.m. to sunset (6 mos.). *Source of income:* Governmental appropriation. *Library:* Reference. About 12,000 volumes and 1000 pamphlets. *Herbarium:* "Many thousands." Actual number unknown; estimated about 1,500,000. The National Herbarium with associated Botanical Library has now (1934) been combined with the Garden's Herbarium and Library. *Plantations:* Systematic, with special reference to the use of students. Species under glass: Several thousand. *Herbaceous plants out of doors:* Several thousand species. (Approx. 10,000 species.) *Publications:* Catalogue of Plants. 1883. Handbook and Guide to the Gardens. 1908. Seed List. 1911 (Australian seeds only). *Museum:* Economic botany and plant products. Open free, week-days, Saturdays excepted, from 2–4 p.m. *Study material:* Living material, including wild plants, is supplied to both public and private schools, in some cases regularly, in others occasionally on request. Some classes and colleges depend upon the garden for all their supply material.

PERTH

Sterling Gardens

Perth, Western Australia

Established: 1840. *Area:* 6 acres.
Director (Head Gardener): John Gates (1929).

Note: The Secretary, State Gardens Board, Premier's Department, Perth, writes: "There is no properly organized Botanic Garden in Perth; our city gardens more properly come under the heading of 'Rest Parks.'" This information is recorded here because this park is sometimes referred to in print as a "botanic garden."

ROCKAMPTON

Botanic Garden

Curator: R. Simmons (1921).

SYDNEY

Botanic Gardens of New South Wales

New South Wales, Australia

Established: 1816. *Area:* Garden 62 acres; park 129 additional acres.

Directors (Curators):

1. Charles Frazer (1828–1831)
2. John McLean (1832–1833)
3. Richard Cunningham (1833–1835)
4. James Anderson (1835–1837)
5. Allan Cunningham (1837–1838)
6. James Anderson (1838–1842)
7. William Robertson (1842–1844)
8. James Kidd (1844–1847)
9. John Carne Bidwell (1847–1848)
10. Charles Moore (1848–1896)
11. J. H. Maiden (1896–1924)
12. G. P. Darnell-Smith (1924–1933)

    (The title "Director" was discontinued on the retirement of Dr. Darnell-Smith)

13. Edwin Cheel (1933–)

    Appointed as Botanist and Curator of the National Herbarium

13a. E. N. Ward, Curator of the Gardens (1933–?)

14. R. H. Anderson (1937)

Serves as a public park. Open free daily, 7 a.m. to 6 p.m. in summer; 7 a.m. to 5 p.m. in winter. *Source of income:* Annual appropriations by the State. *Library:* Reference. About 5000 volumes and 10,000 pamphlets. *Herbarium:* About 500,000 specimens (phanerogams and cryptogams). *Museum:* Open free, Mondays to Fridays, from 11 a.m. to 5 p.m. There are no loan collections for schools. Students from the University attend for lectures on Forestry and special studies. Living material for study, including native plants, is supplied to botany classes, and a limited number of herbarium specimens for special study at High Schools. Exchanges are made with leading Botanical Institutions throughout the world.

Austria

CERNAUTI (FORMERLY CZERNOWITZ)

BOTANIC GARDENS OF THE STATE UNIVERSITY "REGELE CAROL II"

Established: 1877. *Area:* 4 hectares.
Directors:
Karl Linstauer (1910–1911) M. Gușuleac (?–?)
Otto Porsch (1912–1918)

Serves as a public park. Open free daily in summer, to adults only, 6 a.m. to 8 p.m. *Source of income:* State appropriation to the University. *Library* of Botanical Institute of the University. About 1500 volumes. *Herbarium:* About 35,000 specimens; about 10,000 species. *Plantations:* Systematic, morphologic, ecologic, local flora, phylogenetic, pharmaceutic, technical. *Publication:* Samenverzeichnis. *Museum:* In the Botanical Institute of the University. *Study Material:* Supplies both public and private schools, when requested, with all kinds of living plant material for study. *Instruction:* Lectures and practicums are given to university students. Botanical excursions are conducted in the garden and in the field by members of the staff.

GRAZ

BOTANISCHER GARTEN DER UNIVERSITÄT
Holteigasse 6, Graz III

Director: F. J. Widder (1937)

HATZENDORF

JARDIN BOTANIQUE EXPERIMENTAL
Hatzendorf b. Fehring, Styria (Steiermark)

Proprietor: Dr. Fritz Lemperg (1936). Seed List.

INNSBRUCK

BOTANISCHER GARTEN DER UNIVERSITÄT INNSBRUCK
Innsbruck (Hötting), Sternwartstr 13

Established: 1793. *Area:* 20,000 sq. meters.
Directors:

J. A. Schultes (1808–1826) Johan Peyritsch (1879–1889)
Friese (1826–1847) Emil Heinricher (1889–1928)
Fuchs (?–?) Adolf Sperlich (1928–)
Anton Kerner von Marilaun (1860–1878)

Note: Between Friese and Kerner there were five "acting directors" (*Vertreter*), *fide* E. Heinricher (Geschichte der Bot. Gard. der Univ. Innsbruck. Jena, 1934, p. 6).

Serves as a public park, open free daily. *Source of income:* Appropriations from the State. *Annual budget:* 1. The employees of the Garden and Institute are State employees. Building improvements and alterations are made by the University building administration. Since the economic crisis of 1931 governmental appropriations have been entirely abolished and the Garden is now supported by the income derived as admission fees and fees of students. *Library:* There is no separate library apart from that of the Botanisches Institut, which is in charge of the Director of the Garden. *Plantations:* (*A*) Trees, shrubs and herbaceous plants are in systematic arrangement. In the Monocotyl section the arrangement is geographic and ecologic (plant societies). (*B*) Oecological and physiological groups according to Heinricher. (*C*) Aquatic plants. (*D*) Alpine plants, in two groups —Alps proper; other mountains. (*E*) Plants of the Caucasus. (*F*) Plants of Northeastern America. (*G*) Poisonous plants. (*H*) Scientific experimental garden (not open to the public). *Publication:* Samen Tauschkatalog. *Museum:* A part of the Botanical Institute. *Loan collections:* Herbarium is open to all scientific workers and loans to local schools such material as is available. *Study material:* A section of the Garden has been devoted to genetical and physiological experiments. The entire plantation of the Garden is devoted primarily to the botanical instruction in the University.

Note: In 1798 Matheus Schöpfer maintained a house and garden of 343 square fathoms (" *Quadratklafter* "). This was the oldest " botanic garden " in Innsbruck. At the Hötting site Heinricher installed an ecological grouping, which was later imitated at Munich, Berlin, and elsewhere. There were 12 groups, as follows: (1) Compass plants, and others whose leaves were alike on the upper and under sides; (2) " Night-sleeping plants "; (3) Parasites; (4) Dissemination of fruits and seeds; (5) Insectivous plants; (6) Bog-plants; (7) Climbing plants; (8) Hybrids; (9) Abnormalities (Teratology); (10) Cultivated varie-

ties; (11) Thorns and briers; (12) Leafless and nearly leafless plants. (De Vries. De botanische tuire te Innsbrück. Supplement to E. Heinricher, l.c.)

KLAGENFURT

Botanischer Garten des Naturhistoriches Landesmuseum Rudolfinum

Museumgasse 4

KREMSMÜNSTER

Botanischer Garten der Obergymnasiums der Benediktiner in Kremsmünster

Benediktiner Stift, Kremsmünster, Upper Austria

Established: 1889. *Area:* 3187 sq. m. (0.3187 hectare).
Directors (Kustos): Father Anselm Pfeiffer (1889–1902); Father Leonhard Hugerer (1902–?).

Source of income: Endowment. *Library:* Reference, only. About 1000 volumes, and about 200 pamphlets. *Herbarium:* More than 500 specimens. *Plantations:* Systematic, ecologic (biological groups), Alpine plants, small arboretum and fruticetum.

LINZ

Botanischer Garten der Stadtgemeinde Linz

(Variant: Botanischer Garten der Landeshauptstadt)

Dinghoferstrasse, Linz, an der Donau (Danube), Upper Austria (Oberösterreich)

(The garden is still at the same location where it has always been. However, Gemeindestrasse has been changed to Dinghoferstrasse.)

Directors: Franz Zischka, Franz Wüle.

Open free, daily, 8–12 a.m., 2–6 p.m. on week-days; 8–12 a.m. on Sundays and holidays.

Source of income: Appropriation by city. *Library:* Small. The Upper Austria Landesmuseum has a library of natural science of 15,000 volumes and 187 journals currently received. *Herbarium:* The Upper Austria Landesmuseum has a large her-

barium. *Plantations:* 1. Large alpine garden; 2. subalpine meadows; 3. water and swamp plants; aquatic plants and ferns; 4. Pannonisch and Pontische Flora (1–4, together, over 6000 species). Systematic, with a particular reference to local flora (about 1000 species). *Conservatories:* More than 1200 species, especially Cacti and Succulents. *Publication:* Seed List.

Garden is visited by more than 130 school classes during the year. Legally protected plants are shown three times a year to government officials. Plants are supplied to schools for study.

The former owner of the Botanic Garden was the "Verein für Naturkunde in Linz." On account of conditions after the war this organization was discontinued in 1922 and since then the City of Linz administers the Botanic Garden.

The members of the "Verein für Naturkunde" joined the Oberösterreichischen Musealverein in Linz, which was founded in 1833. This scientific society of Upper Austria, with more than 1000 members, supports the Landesmuseum (since 1920 in the possession of Upper Austria) through publishing a "Jahrbuch," and by exchange of journals and scientific cooperation.

SALZBURG

Botanischer Garten

Established: 1835. *Area:* 3000 sq. meters.
Directors:

1. George Hinterhuber, Apothecker (1835)
2. Franz Schuh (1836–1837)
3. Josef Karl Holfstein (1837–1852)
4. Gustav Wolf (1842–1849)
5. Johan Biatzovsky (1850–1863)
6. Karl Aberle (1863–1880)
7. Eberhard Fugger (1880–?)

Serves as a public park. Open free daily, April 1 to October 1, 8–10 a.m. and 2–6 p.m. Sundays and holidays, 8–10 a.m. *Library:* Reference. *Herbarium:* More than 3000 specimens. *Plantations:* Local flora of Salzburg and economic plants. Publication: Seed List. *Study material:* Living material, including wild plants, supplied when requested to local public schools.

SCHÖNBRUNN (VIENNA)

Oesterreich Bundesgarten

Schoenbrunn, Wien

This Garden is in the palace grounds in the southwestern outskirts of Vienna.

VIENNA (1)

Botanischer Garten und Botanisches Institut der Universität Wien

Rennweg 14, Wien III

Founded: 1754. *Area:* Almost 8 hectares (19.76 acres).
Directors:

1. Robert Laugier (1754–1768)
2. Nicolaus Josef Freiherr von Jacquin (1768–1796)
3. Josef Franz Freiherr von Jacquin (1796–1839)
4. Stephan Endlicher (1839–1849)
5. Eduard Fenzl (1849–1878)
6. Anton Kerner Ritter von Marilaun (1878–1898)
7. Richard Wettstein Ritter von Westersheim (1899–1931)
8. Friedrich Knoll (April 1933–)

General admission free. Open from 7 a.m. until sunset, April 1st to October 31st.

Source of income: Part of lecture fees from the University of Vienna (Philosophical faculty). Wages for garden workers are paid by the Government (Ministry of Instruction). *Library:* (1934) about 10,000 volumes and 10,000 pamphlets. Periodicals, about 80. *Herbarium:* About 1,000,000 species from all departments (Thallophyta, Bryophyta, Pteridophyta, Anthophyta). *Departments of the Garden:* Systematic, geographic, ecologic, economic. Greenhouses (7 hothouses, 6 cold-houses). Experimental Garden for special cultures and research. *Greenhouse plants:* About 5000 species. *Out-door plants:* (Woody plants and herbs together) about 2000 species. *Botanic Museum:* Open free to public every Saturday from 9 a.m. to 12 noon. To Scientists, open at all times upon application to the Director's office. Contains about 3000 objects, partly dry and partly preserved in liquid. *Picture collection:* About 6000 pictures (incl. portraits); 2000 photographic negatives. All aforesaid collections are for use only in connection with the University lectures and for scientific research of the Uni-

versity, and are not loaned for other purposes nor to other persons. *Publication:* Samenverzeichnis.

VIENNA (2)

Botanischer Garten im Belvedere

Prinz Eugenstrasse 27, Belvedere, Wein III/40

Director: Franz Metschkal (1936). Samentauschliste.

Belgian Congo

EALA

Jardin Botanique d'Eala

Eala, Congo Belge, Africa

Established: 1900. *Area:* Jardin Botanique 20 hectares; Champs d'essais, 200 hectares.

Directors:

1. Léon Peynaert (1900–1908)
2. Félix Seret (1908–1910)
3. Moreel Laurent, acting (1903–1904, 1906, 1910)
4. Acting Directors (1911–1914); Brown (1911); Lefevre; Vendelmans; Dauvrin; Bonnivair; Nannan
5. Vermoesen (1914–1915)
6. Acting Directors (1915–1917): Danorin; Lamboray
7. Risch (1917–1919)
8. Bogemans (1919–1920)
9. Groossens (1920–1928)
10. Cerbissier-Baland (1928–1933)
11. G. Gilbert, acting (1933–1934)
12. J. Leemans, acting (October, 1934–June, 1936)
13. G. Cuteaux, Conservateur (July, 1936–)

Source of income: Appropriations from the Colonial Government through the Institut National Pour l'Etude Agronomique du Congo Belge. *Library:* Reference. 1000 volumes, 2000 pamphlets. Current periodicals received, 75. *Herbarium:* 3000 specimens. *Plantations:* Systematic; Arboretum; Fruticetum. *Herbaceous plants outdoors:* 2200. *Publications:* Catalogue des végétaux (1924). "Communications" (in Bull. Agricole du Congo Belge). *Small museum.*

ELISABETHVILLE

Arboretum du Comité Spécial du Katanga

Route de l'Etoile

Belgium

ANTWERP

Jardin Botanique de la Ville d'Anvers

Rue Leopold 24, Antwerp, Belgium

Area: About one hectare.

Directors:

W. Verbert (?)
W. Sommee (?)
M. Van Heurck (1874–1909)
H. de Beukelaer (1909–)
Jr. E. J. B. Verleyen (1936)

Serves as a public park. Open free daily, 6 a.m. to 7 p.m. in summer; 7 a.m. to 4 p.m. in winter. *Source of income:* Municipal Appropriations. *Library:* Reference only. *Herbarium:* 300,000 specimens. *Plantations:* Systematic (following *Prodromus* of de Candolle); morphological; biological. *Publications:* Annual report, Seed List. *Museum:* Open to the public free, Sundays and holidays, 9 a.m. to 5 p.m. *Lectures to school children* at the garden about 35 annually, in addition to other public lectures. *Study collections* are loaned to schools as follows: herbarium specimens, dried seeds, alcoholic material, microscopic slides, lantern slides, economic plant products. *Living material* for study is supplied to schools. Both public and private schools are supplied on request. Local schools depend upon the garden for all their study material. Courses of instruction in botany and microscopy.

AUDERGHEM

Jardin Experimental Jean Massart

Chaussée de Wavre, 1850

Established: 1928. *Area:* More than 4 hectares.
Director: Alexandre Conard (1937).

This Garden was begun in 1922 by Jean Massart, who died August 16, 1925. His colleagues, students, and other friends formed an association to continue his work at the same place (Rouge-Claître, Auderghem, southeast of Brussels). The association has the same name as the Garden, which has six departments: 1.

Jardin experimental; 2. Jardin botanique; 3. Arboretum; 4. Collection of roses; 5. Large pond; 6. Laboratory.

The Jardin Botanique is arranged on the basis of "Ethology," which was Massart's main botanical interest. The Garden, we are told, is laid out like a beautiful park, the dominating idea being ecology. The plants are grouped according to the principal ecological associations which are found in Belgium—*Les Naturalistes Belges* (*Bull. Mensuel*). No. 7. July, 1928.

Publication: Liste de Graines Récoltées. *Affiliation:* Université Libre de Bruxelles.

BRUSSELS

Jardin Botanique de l'Etat

236 Rue Royale, Bruxelles, Belgium

Established: 1870. *Area:* 16 acres.
Director: W. Robyns (1936).

Open free, daily. *Source of income:* Ministère de l'Agriculture. *Herbarium:* Many thousand specimens. *Plantations:* Systematic, Engler and Prantl system. Especially succulents—Cactaceae, Liliaceae, Aiozaceae, Crassulaceae; Geographic (plants of Belgian Congo). *Conservatory:* About one acre under glass. *Publications:* Bulletin du Jardin Botanique de l'Etat (2 numbers a year). Seed List. *Note:* Questionnaire not returned.

GENT (GAND)

Jardin Botanique de l'Université de l'Etat

Rue Ledeganck 31

LAEKEN

Jardin Colonial de Laeken

521 Boulevard Em. Bockstall, Brussels, Belgium

Established: 1900. *Area:* About 3 hectares (of which 16 ares are under glass).
Director: René Kinds (1900–?)

Open, free, daily as authorized, except Sundays and holidays. *Source of income:* Appropriations by the colonial government. *Plantations:* Plants are arranged "according to origin, use, and mode of culture." *Species under glass:* 900–1000. *Publications:* Seed List. Bulletin Agricole du Service de l'Agriculture du Min-

istère des Colonies. *Instruction:* Confined to the agriculturists of the Colonial Service. Living material of colonial economic plants is supplied to both public and private schools when requested.

LIÉGE

Jardin Botanique de l'Institut Botanique de l'Université d'Etat

3 rue Fusch

Established: 1835. *Area:* ¼ hectare.
Directors:

1. Charles Morren (1835–1856)
2. Edouard Morren (1857–1887)
3. Auguste Gravis (1887–1927)
4. Raymond Bouillenne (1927–)

Serves as a public park. Open, free, daily at all hours. *Source of income:* State (University) governmental appropriations. *Library:* Bibliotheque de l'Institut, 1020 volumes, 6000 separata. *Herbarium:* 10,000 specimens. *Arboretum and Fruticetum. Plantations:* Systematic. *Publications:* Archives de l'Institut de Botanique de l'Université de Liége. *Lectures:* Special lectures are given to school children at the Garden, and the Garden supplies living matter to the schools for study.

LOUVAIN

Jardin Botanique de la Ville

Voer des Capucins

TERVUEREN

Arboretum Geographique

Director: C. Bommer (1937).

Bermuda

HAMILTON

Bermuda Botanic Garden

P. O. Box 262, Hamilton

Established: 1928 (?). *Area:* 17 acres.
Directors: E. J. Wortley (1914–1920); E. A. McCallan, appointed Director of Agriculture, Oct. 1, 1920.

Serves as a public park. Open free, daily from 7 a.m. to 6 p.m. *Source of income:* Governmental appropriation. *Library:* 4000 volumes. *Herbarium:* 700 species. *Plantations:* Systematic. *Publications:* "Flower Garden Calender," "Insects of Bermuda," Monthly Bulletin. *Living material* is supplied to local schools for study. *Affiliation:* The garden is part of the Agricultural Station, under the direction of Board and Department of Agriculture. Note: There appears to have been an earlier garden established 1871 (Nature, Nov. 6, 1919, p. 263).

PAGET EAST

A circular letter of June 11, 1928 announced that a Botanic Garden was then being established in connection with the Agricultural Experiment Station, under Dr. E. A. McCollan, Director of Agriculture (1911–1934). The present Director of Agriculture is T. A. Russell (1937).

Brazil

RIO DE JANEIRO

Jardim Botanico do Instituto de Biologia Vegetal

Established: 1808. *Area:* About 149 acres (fide questionnaire): (54 Hectares).

Directors: John C. Willis (?); Alexandre Curt Boade (1936).

Serves as a public park. Open free, daily from 6–6. *Source of income:* Annual appropriations by the national government. *Herbarium:* "A rich collection." *Library:* Reference. About 1000 volumes and 500 pamphlets. Current periodicals regularly received, 50. *Plantations:* Systematic, ecologic, geographic, economic, horticultural. Arboretum (about 800 trees), fruticetum (about 500 shrubs)—a total of more than 5000 labeled plants. Includes an area of virgin forest. *Publications:* Contributions du Jardin Botanique de Rio de Janeiro. Issued from 1901–7 only. *Small museum,* open free during the same hours as the garden. *Note:* The "Reserva florestal de Itatiaya" (formerly "Estação Biologica de Itatiaya) is a nature preserve ("wild life sanctuary") affiliated with the Garden. This is located on the Rio de Janeiro —São Paulo railroad, about half way between these two cities (Station Homem de Mello); altitude, 800 meters, on the slopes of the 3000 m. high Itatiaya Mts. There are numerous resting points at various elevations.

PARA

HORTO BOTANICO

Director: Jacques Huber (Died, 1914).

SAO PAULO

HORTO OSWALDO CRUZ

Caixa de Correio 65, Butantan

British Guiana

GEORGETOWN

GEORGETOWN BOTANIC GARDENS

Georgetown, Demerara, British Guiana, South America

Established: 1878 (1879?). *Area:* 40 acres.
Directors: G. S. Jenman (1879–1902); Sir J. Harrison (1902–1925); J. Sydney Dash (1927–).

Serves as a public park. Open, free to the public daily from 7 a.m. to 6 p.m. *Source of income:* Supported by Government. *Library:* Small. *Herbarium:* Approximately 20,000 specimens. *Publications:* Seed List. Guide. Devoted to ornamental and experimental horticulture. A few special lectures are given to school children at the Garden. Sometimes supplies living material for study to local schools. This is the largest botanic garden in any British colony of the Western Hemisphere.

NEW AMSTERDAM

BOTANIC GARDENS

New Amsterdam, British Guiana, South America

British New Guinea

RABAUL (NEW BRITAIN)

DEPARTMENT OF AGRICULTURE BOTANIC GARDENS

British West Indies

JAMAICA

GOVERNMENT BOTANIC GARDENS

Public Gardens, Kingston, Jamaica, B. W. I.

Established: 1857. Abandoned for lack of Legislative appropriations, *Re-established* 1871.

Note: The Government Gardens comprise: 1. Hope Gardens (near Kingston); 2. Castleton Gardens; 3. Public Gardens, Kingston; 4. Hill Gardens, Cinchona; 5. King's House Gardens and Grounds; 6. Gordon Town Garden; 7. Bath Garden and Nursery, St. Thomas.

Directors: William Fawcett (1886–1908) Director, Botanic Gardens and Plantations. William Harris (1908–1920) Superintendent, Public Gardens and Plantations. M. S. Goodman (1920–) Superintendent of Public Gardens.

Hill Garden, or "Government Cinchona," is a reservation of several thousand acres, where the Cinchona tree (source of Peruvian bark and quinine) was introduced into cultivation about 1870. Sir Basil Keith first conceived the idea of this Garden in 1774. The plan was first realized in 1869 under Gov. Sir John Peter Grant. In August, 1903, the Jamaican Government leased the property to the New York Botanical Garden by whom it was maintained as a laboratory and sub-station for the propagation of tropical plants for about ten years, when the lease was terminated and the Gardens were taken over again for administration by the Government.

ST. VINCENT

St. Vincent Botanic Gardens

St. Vincent, Windward Islands, British West Indies

Established: 1764. *Area:* 62 acres.

Directors:

1. Dr. George Young (1766–1785)
2. Dr. Alex Anderson (1785–1811)
3. Wm. Lochead, Esq. (1812–1815)
4. Mr. George Caley (1816–1822)
5. *Garden abandoned* (1822–1890)
6. Mr. H. Powell (1890–1904)
7. Mr. W. N. Sands (1904–)

Serves as a public park. Open free, daily, from sunrise to sunset. *Source of income:* Annual appropriations from Colonial Government. *Library:* Reference only. *Plantations:* A general collection of tropical trees and plants. *Publications:* Annual Re-

port. Established 1890. Published by Imperial Department of Agriculture for the West Indies. *Affiliation:* The Imperial Department of Agriculture for the West Indies.

Bulgaria

SOFIA (1)

BOTANICAL GARDEN OF THE FACULTY OF AGRICULTURE

Address: Sofia, Bulgaria. Seed List

SOPHIA (2)

BOTANIC GARDENS OF THE NATURAL HISTORY MUSEUM OF H. M. THE KING

Kings Palace, Sophia, Bulgaria

SOFIA (3)

INSTITUTUM EXPERIENTE AGRARIUM

Institut Central de Recherches Agronomiques d'Etat, Sofia, Bulgaria

Note: Not a botanic garden, but publishes a Seed List (Delectus Seminum).

SOFIA (SOPHIA) (4)

JARDIN BOTANIQUE DE LA FACULTÉ DES SCIENCES

Director: Nikola Arnaudoff (1936). Index seminum.

Burma

MAYMYO

GOVERNMENT BOTANIC GARDENS

Cameroons (Africa)

VICTORIA

JARDIN BOTANIQUE DE VICTORIA

Cameroons, West Africa

Established: 1892. *Area:* 60 hectares.

Directors:

1. Prof. Paul Preuse (1892–1902)
2. Dr. Strunck (1902–1904)
3. Dr. Weberbauer (1902–1906)
4. Dr. Bucher (1906–1911)
5. Dr. Fickendez (1911–?)
6. Prof. Preuss (?)

Serves as a public park. Open free, daily. *Library:* Reference, small. *Herbarium:* More than 900 specimens. *Plantations:* The land is chiefly devoted to practical experimental work. *Museum:* Founded in 1909. *Note:* Le Jardin botanique de Victoria, the chief center of acclimation of the former German colonies, in West Africa, was placed under a British mandate at the close of the World War.

Canada

MONTREAL

• Montreal Botanical Garden

(Jardin Botanique de Montréal)

4101 Sherbrooke Street East, Montreal, Canada

Established: 1936. *Area:* Nearly 600 acres.
Director: Frère Marie-Victorin (1936–).
Publication: List of Seeds, offered in exchange (specializing in interesting and little known Canadian plants).

Note 1: Construction work began in the spring of 1936. The Garden is administered by the Commission du Jardin Botanique de Montréal of five members, including the heads of the botanical departments of the University of Montreal and McGill University (Montreal). There is an administration building (erected by the City of Montreal), two greenhouses, and a nursery (Science, **84**: 10, July 3, 1936). According to the article in *Science,* the first display unit to be laid out is an economic garden for school children and which in 1936, exhibited 124 varieties of fodder plants, grain crops, vegetables, oil-plants, etc.

Note 2: In the spring of 1937 a multigraphed memorandum was circulated among Dominion botanists by the Canadian Department of Agriculture, Experimental Farms Branch, Division of Botany, entitled: " Suggestions for the consideration of the mem-

bers of the Botanical Committee of the National Research Council in relation to the establishment of adequate botanical services for the Dominion."

Topic No. 6 of this memorandum (pp. 10–16) is entitled, "National (Royal?) Botanical Garden or Gardens." Appendix "A" is entitled, "Suggestions for the establishment of a Canadian Botanical Service," signed by H. T. Güssow, Dominion Botanist.

Historical Note: In 1885 there was a movement to establish a botanic garden in Montreal. It was the announced intention of the promoters to make ample provision there for instruction in pure and applied botany. The institution was under municipal control and is stated to have been "killed by political differences in the City Council." The project failed in the same year in which it was started.

OTTAWA

Botanic Garden and Arboretum, Department of Agriculture

The Dominion Botanist, Botanic Gardens, Ottawa, Canada

Established: 1886. *Area:* 65 acres.

Directors: Wm. Saunders, C.M.G. (1886–1909). Then transferred to The Dominion Botanist (H. T. Güssow, 1909–).

Serves as a public park. Open free daily, from 7 to sunset. *Source of income:* Annual appropriations by the Dominion Government. Government Appropriation: 1933—$11,250. *Library:* Reference only. Small. Current periodicals regularly received, 52. *Herbarium:* About 12,400 specimens (Canadian flora only). *Arboretum:* About 2416 species and varieties of shrubs and trees. *Plantations:* Arboretum, herbaceous border, local flora. *Herbaceous plants out of doors:* 2982 species and varieties. *Publications:* Seed Exchange List. The annual account of the work of the garden is contained in the Annual Report of the Experimental Farms Branch. *Material for study* is supplied to public institutions on request, so far as available.

TORONTO

There is a news item in Science, Vol. 82, p. 568, December 13, 1935, referring to a proposal then being considered to establish a botanic garden in Toronto. Sir Robert Falconer was reported

to be Chairman of the Committee in charge of the project. It was stated that, " A ravine area in which the development of the native flora as well as plants from abroad could be effected " was favored by the Committee. *Note:* No reply to our Questionnaire.

VANCOUVER

UNIVERSITY OF BRITISH COLUMBIA BOTANICAL GARDENS

University of British Columbia, Vancouver, British Columbia

Established: 1912 as Government Garden (at Essondale, B. C.). 1916, transferred to University of B. C., at Vancouver. *Area:* 5 acres. Open to public free daily.

Directors: John Davidson, F.L.S., F.B.S.E., Assistant Professor of Botany, Founder, and Botanist in Charge, 1912–?

Library: About 1200 volumes. *Herbarium:* About 20,000 specimens. *Plantations:* Systematic, economic, morphologic. Classified in beds according to Engler & Prantl. *Arboretum* of native trees. *Salicetum. Publications:* Annual Reports (of the Botanical Office, Province of B. C.). Seed List. *Lectures* are arranged for visits of Societies, etc. *Supplies living material* for study to local schools occasionally.

Canary Islands

LA OROTAVA

JARDIM BOTANICO

La Orotava, Teneriffe Island

Ceylon

GAMPOHA

HENERATGODA BOTANIC GARDENS

HAKGALA

BOTANIC GARDENS (See Peradeniya)

PERADENIYA

ROYAL BOTANIC GARDENS

Established: 1810. Transferred from Slave Island to Peradeniya in 1821. *Area:* 146 acres.

Superintendents (Title abolished, 1857):

1. W. Kerr (1810–1814)
2. Alexander Moon (1817–1825)
3. Andrew Walker (Acting) (1825–1827)
4. James Macrae (1827–1830)
5. G. Bird (Acting) (1830–1832)
6. James George Watson (1832–1838)
7. J. G. Lear (Acting) (1838–1840)
8. H. T. Normansell (1840–1843)
9. W. C. Ondaatje (Acting) (1843–1844)
10. George Gardner (1844–1849)
11. G. Fraser (Acting) (March–December, 1849)
12. George Henry Kendrick Thwaites (1850–1857)

Directors:

13. George Henry Kendrick Thwaites (1857–1880)
14. Henry Trimen (1880–1896)
15. J. C. Willis (1896–1912)
16. R. N. Lyne (1912–1916)
17. F. A. Stockdale (1916–1928)
18. W. Youngman (1930–)

Serves as a public park. Open free daily. *Source of Income:* Government appropriations. *Library:* The old Royal Botanic Gardens Library was merged with the Department of Agriculture General Library in 1912. *Museum:* Contains a collection of economic plants of Ceylon. *Herbarium:* A general Herbarium in which the Ceylon indigenous, Ceylon cultivated, and foreign specimens are in separate covers. *Arboretum:* 55 acres established in 1914, a Palmetum of 5 acres in 1916, a Pinetum of 4 acres in 1921. *Research Laboratory.* *Publications:* Trimen has published a Catalogue of plants growing in the Gardens, also a "Hand-Guide to Peradeniya Gardens," which has passed through five editions. An "Alphabetical List of Plants Growing in the Gardens" was published in 1926, and a revision of the "Hand-Guide to Peradeniya Gardens" in 1927, by Youngman. "Annals of the Royal Botanic Gardens, Peradeniya," established in 1901. A "Journal of Pure and Applied Botany," containing chiefly the results of work done wholly or in part in the laboratories and herbarium of the Ceylon Garden, or upon materials supplied by the Garden. Also a "Circular," published at intervals. *Branch gardens:* There is a branch garden on the mountain at Hakgala, containing a large reserved area of both jungle and grass, and a

collection of plants from Europe, Australia, South Africa, the Himalayas, and other tropical mountains. It also contains a small laboratory with living accommodations, and a small herbarium of the local flora and plants cultivated in the garden. There is also a Branch Garden at Heneratgoda, three hours ride from Peradeniya, and lying nearly at sea level. Branch Gardens at Badulla, on the eastern side of the mountains, established, 1886; and a fourth at Anuradhapura, on the north side of the Island, established in 1883, were closed in 1906 when it was decided that the Department should devote greater attention to economic work and to agriculture.

Chile

CONCEPCION

JARDIN BOTÁNICO

This Garden, in process of formation, announces that it will offer, in exchange, seeds of species indigenous to Chile.

SANTIAGO

JARDIN BOTÁNICO

China

AMOY (FOKIEN)

HERBARIUM, BOTANICAL MUSEUM, AND GARDENS OF THE COLLEGE OF SCIENCE OF AMOY UNIVERSITY

CANTON

"A Botanical Research Institute has been established in the University of Kwangsi, and the former British Consulate in Wuchow and the Riverside Park in which it is situated have been allotted to the new Institute. The Park will be remodeled into a Botanic Garden, and 6000–7000 mounted specimens have been transferred from the Botanical Institute of Sun Yatsen University to form a nucleus for the new herbarium." (Fide, *Chronica Botanica,* 1936, p. 101.

KIUKIANG (KIANGSI PROVINCE)

LU-SHAN ARBORETUM AND BOTANICAL GARDEN

Kuling, P. O. Box 4, Kiukiang

Established: About 1933. *Area:* About 50 acres.
Director: R. C. Ching (1937).

Plantations: A systematic Herbaceous Garden was inaugurated, April, 1936. Arboretum. Fruticetum. *Publications:* Annual Report (in Chinese and English); Seed List. *Affiliation:* Fan Memorial Institute of Biology, and Kiangsi Provincial Agricultural Institute. *Note:* The Garden aims to study plants, especially Chinese, in relation to forestry and horticulture. Special attention is being given to the vegetation of Mt. Lu-Shan, where the Garden is situated. Most of the local flora plants are being cultivated in the Garden. Special study of the ferns of China and Sikkim-Himalaya.

NANKING

Botanic Garden of the Sun Yat-Sen Tomb and Memorial Park Commission

68 Ching Hsien Street

Director: H. K. Fu (1936). Seed List.

PEIPING

Botanic Garden, National Museum of Natural History of Peiping

The Director, Institute of Botany, National Academy of Peiping, Hsi Chih Men Wai, Peiping, China

Established: April, 1930. *Area:* About 6 acres.
Director: Liou Tchen-Ngo (1930–?).

Serves as a public park. Admission free, daily. *Source of income:* From the Museum budget. *Library:* About 1157 volumes in the Library of the Institute of Botany, National Academy, Peiping. *Plantations:* Systematic. *Publications:* 1. Contributions from the Institute of Botany. 2. Illustre do Nord de la Chine. 3. Index Seminum, 1930, 1933. 1 and 2 are issued by the Institute of Botany, National Academy of Peiping. *Museum:* Open daily from 6 A.M. to 6 P.M. Admission, 10 cents. *Study collections* to loan to schools. *Affiliation:* The Garden is affiliated with the Institute of Botany, National Academy of Peiping.

PEIPING

Botanical and Zoological Garden.—San-pei-tzu-Yuan

Cochinchina

HANOI

JARDIN BOTANIQUE ET D'ACCLIMATATION DE HANOI

Ecole Superieure d'Agriculture et de Sylviculture de l'Indochine (Cochinchina)

Established: September 3, 1889. On March 21, 1918 it was given over, in great part, to the municipality for a public garden, and the experimental plots to "l'Ecole superieure d'Agriculture et de Sylviculture de l'Indochine"; thus it is now partly just a public park and partly scientific. *Area:* 20 hectares in the beginning.

Directors:

September 3, 1889, M. J. Martin
November 8, 1896, M. Ch. G. Lemarie, Agronomical Engineer
November 9, 1901, M. L. Jacquet
December 1, 1907, M. E. Lafitan
March 7, 1910, M. Ch. G. Lemarie, Agronomical Engineer, Director of Agricultural & Commercial Services of Tonkin
January 1, 1915, M. Breymann, in charge of carrying on business during the mobilization of the Director as "Officier de Complement."

The Garden serves now only as a public park. Admission free at all times. *Source of income:* The municipal budget. *Arboretum:* Many of the trees died during the World War. *Plantations:* No longer any labelling system. The classification was formerly systematic. *Affiliation:* That part of the Garden given over to l'Ecole Superieure d'Agriculture et de Sylviculture for experimental plots is now connected with the Universite Indochinoise, of which this school is a part.

SAIGON

JARDIN BOTANIQUE DE SAIGON

Established: 1864, as both a commercial and a scientific institution. *Area:* 12 hectares.

Directors:

M. Germain (1864–1865)
L. Pierre (1865–1877)
Corroy
Moquin Tandon
J. Martin
Ed Brousmiche
Jacquet
E. Haffner (1897–1909)
Paul Morange (1909–1918)
Magen (1919–?)

Open free, daily, at all hours. *Source of income:* The government of Cochinchine; receipts from sale of plants and seeds. *Library:* Small; reference only. *Herbarium:* More than 10,000 specimens. *Arboretum de Trang-Bôm:* About 2000 species. *Fruticetum:* More than 200 species. *Plantations:* Besides the garden proper, there are nurseries, propagating beds, and large experimental plots, which are part of the "Service Economique." *Publications:* 1. "Catalogue des plantes existant au Jardin Botanique et a la Ferme experimentale des Mares," by M. Corroy. 2. Enumeration des vegetaux a l'etude en Cochinchine (La Cochinchine en 1878). 3. General catalogue of classified plants in the Jardin Botanique de Saigon. 4. Catalogue of seeds for exchange. 5. "Le Caoutchouc de plantation," M. Morange. 6. "La culture de l'Hevea et du Cocotier," M. Morange. 7. "Les Travaux secondaires d'hydraulique agricole," M. J. Robin. 8. "Catalogue des plantes du Jardin Botanique de Saigon" by M. Aug. Chevalier. 9. Essays published in the Bulletin Economique and in the Bulletin Agricole de l'Institut Scientifique de l'Indochine. *Special lectures* in horticulture and gardening. *Study Material:* The garden is prepared to furnish such study material to schools as they demand. *Affiliation:* Le Jardin Botanique de Saigon is affiliated with the Institut Scientifique de l'Indochine.

Cuba

HAVANA (1)

El Jardin Botánico del Instituto de Segunda Enseñanza de la Habana

Calzada de Carlos III

Established: 1901. *Area:* 4 hectáreas.
Director: Filipe Garcia Cañizares (1905–).
Open free on all "work days," 6–10 a.m., 2–5 p.m.

Note: Cañizares (El Jardin Botánico del Instituto de Segunda Enseñanza de la Habana. Habana, 1918, p. 11) states that the history of the Botanic Garden of the Institute is, in its beginning, intimately associated with that of the Jardin Botánico de la Universidad Nacional. The two represent the continuation of the garden that, under the auspices of the Patriotic Society of Friends of the Country was inaugurated May 30, 1817 on the site of the station of the Villanueva Railway, and which later, "by action of the Cuban Congress," was successively the site of the Presidential Palace and of the Capitol of Cuba.

HAVANA (2)

Jardin Botánico de la Universidad

Established: May 30, 1817.
Directors:

1. José Antonio de la Ossa (1817–1827)
2. Ramon de la Sagra (1827–1831)
3. Temporarily discontinued (1831–)
4. Pedro Alejandro Auber (acting) (1831–1843)

Note: The period 1864–1897 (called the "Second Epoch" of the Garden by its historian, Felipe Garcia Cañizares) was characterized by scientific and administrative disorganization. The period, 1897–1914, is called the "Third Epoch." During the academic year 1904–1905 a fence was erected separating the Jardin del Instituto de Segunda Enseñanza from the Jardin de la Universidad.

SOLEDAD

Atkins Institution of the Arnold Arboretum, Harvard University

Soledad, Cienfuegos, Cuba; or Arnold Arboretum, Jamaica Plain, Mass., U. S. A.

Established: 1901. *Area:* About 300 acres.
Directors:

1. Robert M. Grey, Superintendent (1901–September, 1935)
2. Elmer Drew Merrill, Administrator (October 1, 1935–)

Note: Established under the name "Harvard Botanic Station for Tropical Research and Cane Sugar Investigation." The title has varied. In 1927 it was "Harvard Botanical Gardens, Soledad Estate, Cienfuegos, Cuba (Atkins Foundation)." The official one given above was adopted in 1932. The Administrator of Botanical Collections, Harvard University, has general supervision over this Institution as one of the separately endowed units of Harvard. About one half the 300 acres has been developed as a tropical botanic garden. The remaining part will be developed as funds become available. The land and its endowment were given by Mr. Edwin F. Atkins, who established the Soledad Sugar Estate.

Laboratory equipment is available for visiting scientists at Harvard House (Casa Harvard), constructed by Mr. Atkins. Those wishing to use the facilities should (1937) communicate with Dr. Thomas Barbour, University Museum, Cambridge, Massachusetts.

Note: This Garden was "formally inaugurated" in 1901 on Colonia Limones, about one-half mile from the present (1926) Harvard Biological Laboratory." A small greenhouse was erected in 1902 "for the germination of tropical seeds and propagation of tender cuttings; also for small plants requiring extra heat and moisture during the drying winds and cool winter weath." "The first seedling sugar cane raised in Cuba of which there is any authentic record, originated in the Harvard Botanical Gardens at Soledad in 1902 and 1904.

Czechoslovakia (Č.S.R.)

BRNO (1)

BOTANIC GARDEN OF MASARYK UNIVERSITY
Kounicova 63

Director: J. Podpěra (1936).

BRNO (2)

BOTANIC GARDEN OF THE AGRICULTURAL COLLEGE
(Vysoká Škola Zemědělská)
Cemá Pole 102

MÄHRISCH OSTRAU (MORAVIAN OSTRAU)

BOTANIC GARDEN (BOTANICKÁ ZAHRADA)

OLOMOUC (OLMÜTZ)

BOTANIKÁ ZAHRADA V OLOMOUCI
(BOTANIC GARDEN IN OLMÜTZ)

Established: 1901. *Area:* 600 square meters.
Directors:

1. Leopold Frank (1901–1910)
2. Konrad Zelenka (1910)
3. Anton Heske (1911–1919)
4. Josef Otruba (1919–)

Serves as a public park. Open free daily at all hours. *Source of income:* "Annual appropriations by city, state, country, private subscriptions, membership dues." *Membership:* Honorary members: No payment. Founders: Kč 100.00. Contributors: Kč 5.00. *Library:* Reference only. About 540 volumes and 160 pamphlets. *Plantations:* Systematic, morphologic, ecologic, local flora, alpine plants, water plants, economic section, medicinal section. Special section for growing plants with which to supply schools. *Arboretum:* About 200 species. *Fruticetum:* About 100 species. *Species under glass:* About 500 pieces. *Plants out of doors:* About 3000 pieces. *Publications:* Ueber die Bedeutung und Einrichtung wissenschaftlicher Garten und die Anlage des botanischen Gartens in Olmütz. By Prof. Hugo Lanner. Seed lists yearly. 1. Bericht der Naturwissenschaft Sektion des Vereins Botanischer Garten in Olmütz, Olmütz 1905. 2. Bericht der Naturwissenschaft Sektion des Vereins Botanischer Garten in Olmütz, Olmütz 1910. 3. Bericht der Naturwissenschaft Sektion des Vereins Botanischer Garten in Olmütz, Olmütz 1913, enthaltend den "Führer durch den Botanischen Garten in Olmütz" (By Prof. Heinrich Laus and K. Zelenka.) *Study Collections:* Herbarium specimens and dried seeds are loaned to both public and private schools, and living material (not including wild plants) is supplied to local schools, both for botanical study and for classes in drawing.

PRAG (PRAHA) (1)

Botanic Gardens of the Charles University

(Botanická Zahrada Karlovy University)

Na Slupi 433, Praha II, Č.S.R.

Director: Josef Velenovský (?–1930); Karel Domin (1930?–). Index Seminum (Seznam Semen).

PRAG (PRAHA) (2)

Botanischer Garten der Deutschen Universität

Viničná 3a, Praha II

Director: Adolf Pascher. (Samen Verzeichnis.)

PRŮHONICE

Dendrological Garden

(Dendrologicka Zahrada V Průhonicích)

Pruhonice u Prahy (near Prag)

Director: Karel Domin (1937). Index Seminum.

ROUDNICE (RAUDPITZ)

BOTANICKA ZAHRADA. Seed List

TABOR

HORTUS BOTANICUS (BOTANICKÁ ZAHRADA)

Zemská Višši Škola Hospodářská, Tabor, Č.S.R.

Director: Prof. Adolf Kutin. Delectus Seminum.

Denmark

CHARLOTTENLUND (NORTH OF COPENHAGEN)

HORTUS DENDROLOGICUS (ARBORETUM)

See also Copenhagen (1).

COPENHAGEN (1)

UNIVERSITETS BOTANISKE HAVE, KØBENHAVN

Established: 1871–74. *Area:* About 25 acres.
Directors:

1. Christen Friis Rottboll (1778–1797)
2. Erik Nissen Viborg (1797–1801)
3. Martin Vahl (1801–1804)
4. Jens Wilken Hornemann (1804–1841)
5. Joakim Frederik Schouw (1841–1852)
6. Frederik Michael Liebmann (1852–1856)
7. Johan Lange (1856–1876)
8. Didrik Ferdinand Didrichsen (1876–1885)
9. Johannes Eugenius Bulow Warming (1885–1911)
10. Christen Raunkiär (Nov. 1, 1911–Aug. 8, 1923)
11. Carl Hansen Ostenfeld (Sept. 1, 1923–Jan. 16, 1931)
12. Knud Jessen (July 1, 1931–)

Serves as a public park. Open free, daily, 1 p.m. to sunset; to students throughout the day. *Source of income:* Annual appropriation by national government. *Library:* More than 20,000 volumes and pamphlets. *Herbarium:* More than 400,000 specimens, not counting *cryptogams.* *Arboretum:* About 650 species. *Fruticetum:* About 1200 species. *Plantations:* Systematic, Ecologic, Local Flora, Rock Garden. Arboretum and Fruticetum systematic; Local flora partly systematic, partly ecologic. Herbaceous

plants systematic. *Publications:* Arbej der fra den botaniske Have i København; Vjledning Universitetets botaniske Have, Novnling dennes biologiska Grupper. Index Seminum includes also seeds collected in the Botanic Garden of the Agricultural College of Denmark, in the Arboretum at Charlottenlund, and the Garden of Dr. F. Borgesellii, at Hellebaek. *Museum* is open to students and botanists only, from 12–4 p.m. *Living material* for study and seeds are furnished when requested to every school in Denmark. For many years the average distribution reached 10,000–14,000 samples per year. *Note:* The first garden was started in 1600 near the University. The second was laid out by the botanist Oeder. The third, and present, was laid out in 1871–74 on the site of the old fortifications of the City—i.e., on the outskirts, near Charlottenborg. It now lies in the center of the City, so greatly has the City grown.

COPENHAGEN (2)

Botanic Garden of the Agricultural College

See also Copenhagen (1)

DISKO

Botanic Garden

Den Dansk Arktiske Station Paa Disko N. 12, København, Denmark

Established and endowed, 1906 by A. Holck as Den Danske Arktiske Station Paa Disko. (On the island of Disko off the west coast of Greenland, Latitude 69°15′. The station has been taken over by the Danish government.)

Director: Morten P. Porsild.

Cultivates the plants of the Arctic regions, and is open to visiting investigators.

Dominica

ROSEAU

Agricultural Department and Botanic Gardens

Roseau, Dominica, Leeward Islands, West Indies

Director (Superintendent): F. G. Harcourt.

Affiliation: Imperial College of Tropical Agriculture, Trinidad.

Botanical investigation is no longer carried on at the College, but the Garden is maintained.

Dutch East Indies

BUITENZORG

'S LANDS PLANTENTUIN (GOVERNMENT BOTANIC GARDENS)

Buitenzorg, Java, Dutch East Indies

Established: 1817. *Area:* 86 hectares (205 acres) at Buitenzorg; 60 ha. (150 acres) at Tjibodas (mountain garden at 4500 feet elevation).

Directors:

1. C. G. L. Reinwardt (1817–1822)
2. C. L. Blume (1822–1826)

   From 1826–1868 there were no directors, but several non-botanical superintendents instead.
3. R. H. C. C. Scheffer (1868–1880)
4. M. Treub (1880–1909)
5. J. C. Koningsberger (1909–1918)
6. W. M. Docters van Leeuwen (1918–1932)
7. K. W. Dammerman (1932–March, 1936) (Acting)

Serves as a public park. Open free, daily, 6 a.m.–6 p.m. *Source of income:* Appropriations by the government. *Library:* Not separated from the library of the Department of Agriculture. *Herbarium:* Number of specimens not exactly known. Total number of plants under cultivation: 10,000 in the garden at Buitenzorg. *Publications:* Annales du Jardin Botanique de Buitenzorg. Established 1876. Published by Brill Ltd. Leiden, Holland. Not offered in exchange. Bulletin du Jard. Bot. de Buitenzorg. Established 1898. Irregularly. Offered in exchange. Scientific publications: Flora of Buitenzorg. Icones Bogorienses. A list of plants cultivated in the garden at Buitenzorg and a seed list are published; free on application. *Laboratories:* There are special laboratories for scientific visitors at Buitenzorg (6 places) and at Tjibodas.

Estonia

TARTU

BOTANIC GARDEN OF THE UNIVERSITY

(TARTU ÜLIKOOLI BOTAANIKAAED)

Lairän 40, Tartu (Dorpat)

Director: T. Lippmaa.

Publication: Acta Instituti et Horti Botanici Universitatis Tartuensis; Index Seminum.

Federated Malay States

KUALA LUMPUR

Public Gardens

Kuala Lumpur, Federated Malay States

Though often referred to as a "botanic garden," The Director of Agriculture, as Chairman of the Gardens, states that it is a pleasure garden, and not a scientific institution.

SINGAPORE

Botanic Gardens

Established: 1859. *Area: 72* acres.
Directors: (first three called Superintendents)

1. L. Niven (1859–1875)
2. H. J. Murton (1875–1882)
3. N. Cantley (1882–1887)
4. H. N. Ridley (1888–1912)
5. I. H. Burkill (1912–1925)
6. R. E. Holttum (1925–)

Serves as a public park. Open free daily at all hours. *Source of income:* Annual appropriations by national government, and sale of plants and seeds. *Library:* Reference only. *Herbarium:* Large and representative collection of plants of the Malay Peninsula and neighbouring countries. *Publications:* Gardens' Bulletin, established 1913. Issued at irregular intervals. Offered in exchange. Seed List. *Plantations:* Systematic, ornamental, economic, arboretum (about 3000 species of trees).

Finland

BORGA

Botanic Garden

HELSINGFORS (HELSINKI)

Kejserliga Alexandera-Universitetets Botaniska Trädgard

Unioninkatu 44

Established: 1828. *Area:* 5.3 hectares.

Directors:

1. C. R. Sahlberg (1828–1840)
2. J. M. von Tengatröm (1840–1849)
3. A. von Nordmann (1849–1857)
4. W. Nylander (1857–1863)
5. A. von Nordmann (1863–1865)
6. S. O. Lindberg (1865–1889)
7. J. P. Norrein (1889–1892)
8. F. Elfving (1892–?)
9. L. Linkola (1937)

Serves as a public park. Open free, daily, during daylight. *Sources of income:* Endowment; appropriations by the state; and by the University (for coal). *Plantations:* Systematic, economic, arboretum, fruticetum. *Study material* (flowers, leaves, and cultivated phanerogamic plants) is supplied to both public and private schools occasionally when requested. *Note:* In the Garden is also the Botanical Museum and the Botanical Laboratory of the University, quite independent from the Garden, but with the same director. They are not open to the public. In connection with them there is a library.

TURKU (ABO)

Botanic Garden of the Finnish University

France

ALFORT (SUBURB SOUTHEAST OF PARIS) (1)

Jardin Botanique

According to Loudon (Enclyc. Gard. Loudon, 1865, p. 102) this Garden, in 1865, contained "the remains of what has been a tolerably complete arboretum," including an extensive collection of hedge plants and hedges, "a grass ground containing patches of several yards square of all the principal grasses [a "Gramineum"], including the cultivated corns," and other economic plants. "Close to the college . . . is [1865] a small systematic botanic garden, representing, perhaps, fifty of the Jussieuean orders."

ALFORT (SEINE) (2)

Jardin Botanique de l'Ecole Vétérinaire

Director: H. Simmonet. Under the Ministry of Agriculture.

ANGERS (MAINE ET LOIRE)

Jardin des Plantes

Butte du Pélican et Rue Boreau

Arboretum de la Maulévrie

Route des Ponts de Cé

ANTIBES

Villa Thuret

Route du Cap d'Antibes, Alpes Maritimes, France

Established: 1858. *Area:* 5.5 hectares.
Directors:

1. Thuret (1858–1875)
2. Bornet (1875–1878)
3. Naudin (1878–1899)
4. Poirault (1899–1936)
5. Simonet (1936–)

Serves as a public park. Open daily, 9–12 and 2–6. Admission 2 francs. *Source of Income:* Ministère d'Agriculture. *Library:* 2500 volumes. *Herbarium:* 600 cartons. *Arboretum* of 3.5 hectares. *Classes from schools* of the Department visit the Garden by appointment. *Affiliation:* "Numerous relations with the University and Natural History Museum of Paris."

AURILAC (CANTAL)

Jardin Botanique de l'Ecole Normale des Instituteurs

BAGNERES DE BIGORRE (HAUTES PYRÉNÉES)

Jardin Alpin et Laboratoire Botanique

Director: J. Bouget (1937).

BELFORT

Jardin Alpin du Ballon d'Alsace

5 Avenue La Gare, Belfort, Alsace, France. (Discontinued, 1936? Mail not delivered)

Established: 1887. *Area:* 120 "mts. carres."
Director (1912): Dubaie-Roy.

Source of income: Maintained by the committee of the Belfort section of the Club Alpin Francais. *Plantations* devoted to Alpine plants.

BESANCON (DOUBS) (1)

Jardin Botanique de l'Université de Besançon

Rue Girod de Chantrans

Established: 1890.
Directors: Antoine Magnin (1890–1919); P. Eberhardt (?).

BIEVRE (SEINE ET OISE)

Jardin Alpin

Director: Société National d'Acclimation, and the local Museum.

BLOIS (LOIR-ET-CHER)

Jardin Botanique Royal

Curator: Robert Morison, about 1651. Discontinued.

BORDEAUX (1)

Jardin Botanique de la Faculté de Médecine et de Pharmacie

Bordeaux, Talence (Gironde), France

Director: J. Golse (1936). Seed List.

BORDEAUX (2)

Jardin Botanique de la Ville de Bordeaux

Director: L. Beille (1936).

Herbarium: Specially rich in flora of the southwest of France.
Library: About 4000 vols. *Publication:* Liste des Graines.

BOURG ST. PIERRE (VALAIS)

"La Linnaea," Jardin Alpin

Established: 1883, by Henry Correvon, under the patronage of an international Committee. In 1915 the Société Académique de l'Université de Genève became owners of the Garden and appointed Dr. Robert Chodat director.

CAEN (CALVADOS) (1)

Jardin des Plantes de la Faculté des Sciences

Directors: Pierre Choux (?–1936); Ferdinand Moreau (1936).

CAEN (CALVADOS) (2)

Jardin du Plantes de Caen

(Jardin Botanique de la Ville de Caen)

Established: 1736(?). *Area:* 5 hectares.

Directors:

1. Marescot (1736–1747)
2. Sebastien Blot (1747–1758)
3. Goubin et Desmoueux (1758–1759)
4. Desmoueux (1759–1786)
5. de Roussel (1786–1797)
6. Desmoueux, returned (1797–1801)
7. de Roussel, returned (1801–1812)
8. Lamouroux (1812–1821)
9. Eudes Deslongchamps (1821–1839)
10. Chauvin (1839–1859)
11. Moriere (1859–1871)
12. Vieillard (1871–1895)
13. Lignier (1895–1916)
14. Houard (1916–1919)
15. René Viguier (1919–1931)
16. Pierre Choux (1932–1936)
17. Ferdinand Moreau (1936–)

This is a municipal garden, although the Botanical Institute, and the School and Museum of Botany are affiliated with the University, and are conducted under the exclusive direction of the Professor of botany of the Faculty of Sciences and the Keeper (conservateur). All the plants of the Garden are at the service of the investigators in the Botanical Institute.

The Garden was founded in 1736 by Marescot, Professor in the University of Normandy, and belonged to that University until 1791. From 1791 to 1803 it was administered by the Department of Calvados. On the latter date it was given to the city. In 1829 it was considerably enlarged. The large conservatory was built

in 1850, and rebuilt and enlarged in 1894 and 1901. The Botanical Institute began in 1891.

The park, planted about 1850, contains many beautiful specimen trees, including *Taxodium distichum, Cryptomeria japonica, Ginko biloba, Pinus Laricio, Cedrus atlantica, Thuya Lobbii, Quercus Ilex, Q. ruber, Fagus sylvatica, Salix Caproea, Sophora japonica,* etc.

The plants are arranged after the order of Hooker.

A seed list is published annually by the conservator.

Note: The faculty of medicine was established in 1448, but it was not until about 1688 that Prof. Callard de la Ducquerie purchased a garden which he filled with plants for use in teaching. Later the University provided modest funds for maintenance of the Garden. The garden called, "*Hortus botanicus agri Codomensis,* contained 559 species, arranged according to their medicinal properties. Marescot succeeded Callard in 1718 (*fide* personal letter from René Viguier). Thanks to the devotion of Maréchal de Coigny, additional land was acquired in 1734 and actually occupied in 1736.

CHAMROUSSE

Jardin Alpin de Chamrousse

L'Université de Grenoble, Grenoble, France. *Altitude:* 1850 meters

Established: 1893, at a place called Roche-Béranger, by the Société des Touristes du Dauphiné. La Société Horticole dauphinoise also gave moral and financial support. In 1898 the Société des Touristes ceded the Garden to the Faculty of Grenoble.

Director: P. Lachmann (1899–1908); Marcel Miranda (1908–).

Source of income: The Ministries of Public Instruction and of Agriculture, the Consul General of Isère, and the City of Grenoble cooperating. This was the third alpine garden in point of time, being preceded by Linnaea (See Bourg St. Pierre, Grenoble (1), and Lautaret).

CLERMONT-FERRAND (PUY-DE-DÔME)

Jardin Botanique de l'Ecole Normale des Instituteurs

DIJON

Jardin Botanique de la Ville de Dijon

Avenue Albert 1er, Dijon, France

Established: (1772) 1833. *Area:* About 4 hectares.
Directors:

1. Pierre Fleurot (1833–?)
2. M. Lavalle (?–?)
3. Alphonse Lagrasse (?–?)
4. Paul A. Genty (1898–?)

Serves as a public park. Open free daily. *Source of income:* Municipal appropriations. *Library:* About 3000 books and pamphlets. *Herbarium:* About 50,000 specimens. *Arboretum* and fruticetum combined. *Plantations:* Herbaceous plants systematic, after De Candolle's "Prodromus." *Publication:* Le Catalogue Annuel des graines récoltées et offertes en échanges. The Director, during spring, conducts free public "Herborizations" (field trips). Study material is supplied to students in the University of Dijon, the Lycées, and schools.

DOUAI (NORD)

Jardin Botanique de la Société Nationale d'Agriculture, Sciences, et Arts

Rue d'Arras 8 bis

ECULLY (RHONE)

Jardin Botanique et d'Essais

Affiliated with the Ecole d'Agriculture Pratique du Rhône.

EVEREUX (EURE)

Jardin Botanique

GRENOBLE (ISÈRE) (1)

Jardin des Plantes de Grenoble

L'Université de Grenoble, Grenoble, France

Established: 1899. *Area:* About 10 acres.
Directors: Joseph Allemand (?); Lachmann (1899–1908); Marcel Miranda (1908–?)

Serves as a public park, open free to the public. *Source of income:* University of Grenoble. *Herbarium:* Devoted to the plants of the western Alps. *Plantations:* Systematic, geographic. The garden is divided into the following sections: 1. A large area, scattered with rocks, simulating a small valley, traversed by a rivulet which empties into a small pond. This section is devoted specially to the flora of Lautaret. 2. A large area, comprising the systematic collection, is devoted to the flora of the western Alps in general. 3. All the rest of the garden is divided into 8 regions, each built up of a collection of rocks, and devoted, respectively, to the following botanical regions: 1. Jura (calcareous rocks), 2. Pyrinus, 3. Mountains of the Mediterranean region, 4. Caucasus and Ural, 5. Eastern Alps and Carpathians, 6. Himalaya, Tibet, Altai, Siberia, 7. Arctic regions, 8. Miscellaneous mountain regions. *Publication.* Seed list.

GRENOBLE (ISÈRE) (2)

Jardin de l'Institut Botanique Alpin du Lauteret

Prof. de Litardière, University de Grenoble

Touring Club de France cooperating. *Seed List.*

GRIGNON

Jardin Botanique d'Ecole Nationale d'Agriculture de Grignon

Grignon (Seine et Oise), France

Established: 1873. *Area:* 2 hectares.
Directors:

1. Mussat (1873–1902)
2. Dr. Griffon (1902–1912)
3. Dr. F. P. Guegnen (1912–1915)
4. Dr. Ducomet (1915–1931) et M. Viennot Bourgin (1926–1931)
5. M. Guyot (1932–) et M. Viennot Bourgin (1932–)

Open to visitors daily, 8–11 a.m. and 1–6 p.m. *Source of income:* Governmental appropriations through the Minister of Agriculture. *Library:* 15,000 volumes. 20 current periodicals received. *Herbarium:* 30,000 specimens. *Arboretum* and *Fruticetum:* Both together comprise 2200 species. *Plantations:* Systematic. Species under glass: "Several thousand." *Publication:* Annales de Grignon.

LA ROCHELLE

Jardin Botanique Departemental de la Charente-Inférieure

Established: 1871. *Area:* one-half hectare.
Directors: 1. Edouard Beltzemieux (1871–1894); 2. J. Foucaud (1894–1906).

Served as a public park; open free, daily from 8 a.m. to 6 p.m.

Note: The president of the Society of Natural Sciences of the Charente Inférieure reports that the Botanic Garden of La Rochelle was discontinued after the death of the last director in 1906, and transformed to an ordinary public garden belonging to the city and maintained by it.

LAUTARET (HAUTES ALPES)

Jardin Alpin

L'Université de Grenoble, Grenoble, France

Established: 1896. *Area:* 3000 sq. meters. Altitude: 2075 meters.
Director: 1. P. Lachmann (1896–1908); 2. Marcel Miranda (1908–).

The Ministry of Works having declined to finance the Garden, M. Bonnabel, proprietor of the local hotel provided the funds for its grading and terracing (1896–1897), and the planting was done in 1899. The most noteworthy feature was a collection of 532 species characteristic of the flora of the western Alps. In 1908 the Garden contained typical representatives of the principal mountain massives of the world.

LAVOINE (ALLIER)

Jardin Botanique

LE PUY (HAUTE LOIRE

Jardin Botanique de l'Ecole Normale des Instituteurs

LAVALLOIS-PERRET (SEINE)

Musée et Jardin Botanique

Rue Lamois 37 Bis

LILLE (NORD)

Jardin Botanique de l'Université Catholique

Rue du Port

LEZOUX (PUY-DE-DÔME)

Jardin et Herbier Classagne

Willow Garden. About 10,000 living species, hybrids, and forms.

LYONS (1)

Jardin Botanique a Châtillon-les-Dombes

Established: 1758, by Philibert Commerson. Discontinued.

Note: Antoine Magnin (Prodrome d'une Histoire des Botanistes Lyonnais. Mem. Soc. Bot. de Lyon **31–32:** 1–140; 1–39. 1906) says that the remnants (des épanes) of this Garden were still at Lyons in 1832.

LYONS (2)

Jardin Botanique de l'Ecole Vétérinaire.

Established: 1763, by La Tourrette at the Guillotière.

Directors:

1. L'Abbé François Rozier (1765–1766)
2. Jean-Baptiste-Antoine Rest-Maupas (?)
3. Jaques-Marie Hénon (1780–1809)

Plantations: Systematic after Tournefort. *Note:* Transferred in November 1796 to the Claustral des Deux-Amants, quai Pierre-Seize. Enlarged in 1802 by the neighboring Claustral, des Cordeliers de l'Observance.

LYONS (3)

Jardin Botanique du Parc de la Tête d'Or

Established: 1773. *Area:* The Park, 114 hectares; the Garden, 13 hectares.

Note: This garden was successively located (1) at Brotteaux near the Loge de la Parfaite-Harmonie (1773–1774), but was not completed there; (2) Clos de la Déserte, below la place Sathonay (1795–1857); (3) Parc de la Tête d'Or since 1857. (For further

data on its organization consult *Soc. Bot. Fr.* 1876 session. Pages c and ci.) The Garden was devastated by a terrible hurricane on August 4, 1853.

Directors:

1. Jean-Emmanuel Gilibert (1795–1799, 1804–1808). Founder of the Garden at the Clos de la Déserte.
2. Gaetano Nicodémi or Nicodémo) (Dec. 27, 1799–1804)
3. Gaspard Dejean, or de Jean de Saint-Marcel March 21, 1808–1819)
4. Jean-Baptiste Balbis (1819–August 20, 1830)
5. Louis-Henry Latil de Thimécourt (July 26–August 18, 1830) Roffavier (Roffavir) (August 19–21, 1830). Three days, only, in office. The Preface of the *Flora* of Balbis is signed " Roffavier "
6. Nicolas-Charles Seringe (August 24, 1830–September 29, 1858)
7. Gustave Bonnet (Director-General of the Parc de la Tête-d'Or, including the Jardin Botanique), (December 1858–1870)
8. Jean-Joseph-Augustin-Ernest Faivre (Actual successor of Seringe as Director of the Jardin Botanique (March 27, 1871–June 24, 1879). First Director at la Tête-d'Or
9. Louis Cusin, Assistant naturalist, was placed in temporary charge of various activities of the Garden, June 30, 1879–March 15, 1880. He continued as assistant naturalist from November 6, 1857 until October 1, 1884.
10. Gustave Dutailly (March 15, 1880–April 5, 1880). He began the Arboretum, the Conservatories, and the labeling of the botanical collections of the City.
11. Antoine Magnin (November 21, 1881–April 30, 1884)
12. Léon Guignard (April 30, 1884–March 1, 1887)
13. Paul Lachmann (1887)
14. Réné Gérard (March 1, 1887–1926)
15. Louis L. Faucheron (1926–)

Open free, daily, from 9 a.m. to 6 p.m. *Source of income:* Annual appropriation by the city. *Library:* Reference. 4500 volumes. *Herbarium:* 1140 cartons of plants. *Plantations:* Systematic (after Bentham and Hooker) ; arboretum, fruticetum (about 1000 species), a small section of medical plants, and one of hor-

ticultural perennials and annuals. *Under glass:* 7000 square meters. *Herbaceous plants* out of doors: 4211 species. *Publication:* Seed List (*Liste de graines*). *Museum:* Rudimentary. *The garden* supplies art schools regularly with living material. *Affiliations:* The University, the veterinary school, and l'Ecole des Beaux-Arts. The director of the Garden is Professor of Botany in the University. *Note:* Le Jardin Botanique et Service des Cultures de la Ville de Lyon is situated in the Parc de la Tête d'Or, which contains also a zoological collection, a pharmaceutical garden, and a conservatory which has been described as "the finest greenhouses in France," containing "a unique collection" of orchids, palms, and cycads.

MALMAISON (SUBURB NORTHWEST OF PARIS)

Jardin Botanique

Loudon states that, at the time of Josephine, this garden "was among the richest in Europe. . . . Various botanical collectors were patronised. . . . The seeds brought home by the navigator Baudin were here first raised, and described by Ventenant in the *Jardin de la Malmaison,* in 1803. . . . In 1813 Bonpland published the first volume of *Plantes rares cultivees à Malmaison* et à Navarre."

MARSEILLES (1)

Jardin Botanique de la Ville de Marseille

Parc Borely, Marseilles, France

Established: 1880. *Area:* 1 hectare.
Directors: 1. Edouard Heckel (1890–1897); 2. H. Jumelle (1897–?).

Serves as a public park, open daily at all hours. *Source of income:* Municipal appropriations. *Library:* Reference. 700 volumes. 200 pamphlets. *Herbarium:* 10,000 specimens, in the general herbarium, and "the herbaria left by deceased botanists." *Plantations:* Systematic. Arboretum (300 species well labelled) in the Parc Borely (50 acres), which surrounds the Garden. *Species under glass:* 2500. *Herbaceous plants* out of doors, 1,850. *Publication:* Catalogue des graines, récoltées au Jardin. *Study material* is supplied to the Faculty of Science and to the Colonial Museum of the University, with which the Garden is affiliated.

MARSEILLES (2)

Jardin Botanique de la Faculté des Sciences

MARSEILLES (3)

Jardin Botanique de la Faculté de Medecine et de Pharmacie

92 Rue A. Blangui

Director: C. Gabriel (1936). Seed List.

METZ (MOSELLE)

Jardin Botanique

Metz, France

Director: C. H. Navel (1935). Catalog des Graines.

MONT DORE (PUY-DE-DÔME)

Musée et Jardin Botanique et d'Essais

MONTPELLIER

Jardin des Plantes de l'Université de Montpellier

Boulevard Henry IV, Montpellier (Herault), France

Established: 1593. *Area:* 5 hectares.
Director: Dr. Galavielle, Professor at the Faculty of Medicine.

Open daily, 7 a.m. to *7* p.m. *Source of income:* Governmental appropriations. *Library:* Numerous works and publications. *Herbaria:* "18 different herbaria." *Plantations:* Systematic, according to de Candolle. *Museum:* Open from 8 a.m. to 6 p.m. Admission by permit from the Director. *Affiliations:* With the University of Montpellier and is attached to the Chair of Botany of the Faculty of Medicine.

MONTREUX (VAUD)

Jardin Alpin "La Rambertia"

NANCY MEURTHE ET MOSELLE

Jardin Botanique de Nancy

30 Rue Ste. Catherine

Established: 1758. *Area:* 1½ hectares.
Director: Edmond Gain (since 1912).

Serves as a public park. Herbarium: 800 cartons at the Institut Botanique. *Plantations:* Systematic (2500 species). *Publication:* Catalogue annuel des semences récoltées. *Affiliation:* The

Garden is affiliated with L'Institut Botanique, Agricole et Colonial de l'Université.

NANTES (LOIRE INFÉRIEUR) (1)

Le Jardin des Apothicaires

Established: 1687–1688. In the archives of the City of Nantes there is a "Memoire pour le Jardin Royal et Botanique de Nantes, créé de 1687–1688 (Archives Municipales de Nantes, supt.-D.D. 339.

Promenades Publiques: Jardin des Apothecaires. This was the ancestor of the present Garden. The letters patent were signed by Louis XIV, February, 1688. This Garden existed for 186 years in the same place. In 1807 the Garden came under the direction of the Société des Pharmaciens. In 1806 the first Jardin Botanique Municipal was established by Hectot. In 1840 the Library was established, and in 1844 the plantations were arranged according to the system of Jussieu.

Old documents have been found in the Archives of Nantes proving that the City was proprietor of an ancient Apothecaries Garden as early as 1473.

Directors:

First Garden

Le sieur Cigogne (Maitre Apothicaire) (1687–?)
Lefebvre de Ferronniére
Duplessis Richard

Under the Revolution

Second (present) Garden

Le Citoyen Hectot (1810–1836). In 1806 he created the nucleus for the present Jardin des Plantes. He qualified as director March 13, 1810.

Under the Municipal Regime (from August, 1820):

See Nantes (2)

NANTES (LOIRE INFÉRIEUR) (2)

Jardin des Plantes de Nantes

Rue Stanislas Baudry, Nantes, France

Established: The present Garden, 1858. (See Nantes (1))

Area: 7 hectares, 15 ares, 60 centares.

Directors:

1. Dr. Ecorehard (Professor 1836. Director 1840–1882. He died December 17, 1882).

In April, 1853, the Garden was renovated and again opened to the public. From 1882–1893, there was no director. The Head Gardener, M. Rochay was in charge.

2. Paul Marmy (April 28, 1893–1897)
3. Théophile Pierre Pellerin (December 20, 1897–1899)
4. Dr. Citerne (November 10, 1899–1908)

In 1909 a bill did away with the scientific directorship, and M. Courbon, an architect was the head with title of "Director of Architecture and Plantations."

5. G. P. L. Durivault, "Jardinier en Chef de la Ville," but acts as technical Director (1921–)

Serves as a public park. Open free, daily in summer, 6 a.m.–8:30 p.m.; in winter, 7 a.m.–to sunset. The greenhouses are open to the public twice a week and at the time of flower shows. *Source of income:* Municipal Budget. *Library:* More than 500 volumes, plus the library of the Director (1000 volumes). *Herbarium:* Local Flora: 1800 species (total 2368 specimens). *Arboretum:* 361 species; fruticetum, 300 shrubs. They are classified systematically (De Candolle system). *Publication:* Seed List. *Museum:* Small collection of wax fruits, herbal of Dr. Ecorehard, and herbal of a local nurseryman (in very good shape). Open free.

ORLEANS

Jardin Botanique

A small garden, on sandy soil. (*Annales d'Horticulture.* Vol. V, p. 311.)

PARIS (1)

Muséum National d'Histoire Naturelle

61 Rue de Buffon, Paris, France

Established: 1635 (See Note 1). *Area:* About 58 acres.

Note 1: The official Popular Guide Book (*Livret-Guide Populaire*) of the Muséum National (including the Jardin des Plantes) states that Louis XIII, by letters patent, dated January 1626 and

registered July 6, 1626, decided that "un Jardin royal" should be planned and established by "le sieur Hérouard," a leading physician, "to contain all kinds of medicinal herbs . . . and for the instruction of the students of the University of Medicine." It was first called "Le Jardin du Roi," then "Jardin Royal des Plantes Medicinales." Since 1635 it has been popularly known as the "Jardin des Plantes."

"The National Museum of Natural History, known under the popular name of Jardin des Plantes, is an Institution of Higher Education comprising nineteen chairs for instruction in the natural sciences," including Botany, Zoology, Physiology, Anthropology, Chemistry, and Geology. This is perhaps the first, and still almost if not quite a unique instance of official recognition of a botanic garden as essentially a museum (or in this case a subdivision of a museum).

In an address delivered August 16, 1882, M. Alphonse Lavallée, president of the Société Nationale d'Horticulture de France, spoke as follows: "The beginning of the seventeenth century seems to be the true starting point of our horticulture. The creation of the Jardin des Plantes was realized in 1626, but our great Establishment of Natural Science was neither completed nor opened to the public until *1634, as Deleuze has proved.* Six years later the first course of lectures was given. Guy de la Brosse, in his pamphlet, 'The Opening of the Royal Garden,' shows that the other European gardens were at that time very small in comparison to that of Paris."

Loudon (Encyclopedia of Gardening, London, 1865, p. 99) says: "The Jardin des Plantes was founded by Louis XIII, in 1610, and finished in 1634." (Gardener's Chronicle, **20** N. S.: 623. *7* July, 1883.)

The date 1635 is the year given on our questionnaire returned by the Muséum National d'Histoire Naturelle.

Directors:

Herouard (1626–)

Guy de la Brosse (1635–1641)

The official Guide names the following as "among his successors": Fagon, whose administration was long and happy;

Cisternay du Fay (died 1739); Buffon, "who sent naturalists into all parts of the globe," to collect for the Museum.

Note 2: In June 1793 the Convention gave "a definitive organization" to the Jardin du Roi, and since then the official name of the entire establishment (including the Jardin des Plantes) has been "Muséum National d'Histoire Naturelle."

The early directors of the Museum were: Daubenton; Bernard de Jussieu (d. 1777); Antoine-Laurent de Jussieu (1777–1826); Adrien de Jussieu (1826–); Des Fontaines (?).

Note 3: During the Consulate (1799–1804) André Thouin organized the scientific and educational work of this Garden to include the collecting of plants of economic interest, propagating them, and distributing them to the botanic gardens of all the Departments of France. There was then a botanic garden in the capital city of each Department. So far as the supply lasted, plants and seeds were sent next to gardens in French colonies, and then to foreign countries. The gardens were enlarged and improved in 1840.

Serves as a public park. Open free daily. *Source of income:* Governmental appropriations. *Plantations:* Systematic (about 11,000 species of herbaceous plants (Guide Book, 1922); economic; geographic (Alpine Garden). *Arboretum,* annexed to the Garden of Jussieu near Versailles. *Fruticetum:* About 1500 species (Guide Book, 1922). *Herbarium:* Includes the collections of A.–L. de Jussieu, of his son Adrien, and of Auguste de St. Hillaire. *Museum:* Open daily. *Study collections* and living plant material are supplied to schools.

PARIS (2)

Jardin Botanique de la Faculte de Pharmacie

4 Avenue de l'Observatoire, Paris VI

Director: E. Perrot (1936).

Publication: Résumé des caractères des Familles végétales, avec la liste des plantes cultivées en pleine terre et dans les serres et un plan du Jardin. By Leon Guignard. 3rd Ed. Toulouse, 1922.

POITIERS (VIENNE)

Jardin Botanique

RENNES (ILLE DE VILLAINE)

Jardin des Plantes de la Ville de Rennes

Place Pasteur, Rennes (Bretagne) France

Area of entire park about 7 hectares.
Director: Emile Moriceau (1913–1935); L. Winter (1935–).
Catalogue des Graines.

RODEZ

Jardin Botanique et d'Essais de l'Ecole Normale des Instituteurs

ROUEN (SEINE INF.)

Jardin Botanique de la Ville Rouen

114, Rue d'Elbeuf

Director: E. LeGraverend (1936). Catalog des Graines.

Of two acres when first laid out. In 1840 removed to a new site of 20 acres, with plants arranged systematically according to Jussieu as modified by Marquis. Included a collection of fruit trees, an arboretum, and a fruticetum. (Loudon.)

ST. CROIX (VAUD)

Jardin Botanique "La Dryade"

SAMOENS (HAUTE SAVOIE)

Jardin Alpin de la Jaysinia

Established by the physician, M. Cognacq-Jay, this "remarkable garden" was preserved by the Forest Service and then committed to the Muséum National d'Histoire Naturelle.

SAVERNE (BAS RHIN)

Jardin Alpin du Col de Saverne

16 Rue de la Gare, Saverne

President: E. Walter. Specializes in rock plants and alpines, and European ferns, especially hybrids.

STRASBOURG

Jardin Botanique de l'Université

7, Rue de l'Université, Strasbourg (Bas Rhin), France

Established: 1882. *Area:* 5 hectares.

Directors:

1. Anton de Bary (1872–1888)
2. Hermann Graf zu Solms-Laubach (1888–1908)
3. Ludwig Jost (1908–1918)
4. Ch. Flahault (1919)
5. C. Howard (1919–1933)
6. H. Chermazon (1934–)

Open free, daily, 7 to 12 (noon); 2 to 5 p.m. *Source of income:* Governmental appropriations. *Library:* 20,000 volumes (Institut Botanique). *Herbarium:* 2500 bundles (Institut Botanique). *Arboretum and Fruticetum. Plantations:* Systematic, Geographic, Economic, Ecologic. *Publication:* Seed List. *Affiliation:* The Garden is affiliated with the Faculty of Sciences of the University of Strasbourg.

TALENCE

Jardin Botanique de Talence

336 Cours Gambetta (pres Bordeaux), Talence (Gironde)

Publication: Graines Récoltées.

Affiliation: Faculté de Médecin et de Pharmacie de Bordeaux.

TARBES

Jardin de la Ville de Tarbes

Director: Emile Moriceau (1911–1913).

TOULOUSE (HAUTE GARONNE) (1)

Jardin Botanique de la Ville Toulouse

Director: G. Nicolas (1937). Catalogue des Graines.

TOULOUSE (HAUTE GARONNE) (2)

Jardin des Plantes

An article by C. Gerber (Bull. Soc. Bot. France **71**: 788–842, 1924) is entitled, "Les jardins botanique toulousains et l'étude

de la flore pyrénienne, sous l'Ancien Régime et la Révolution, d'après des documents inedits." This seems to imply that there has been more than one botanic garden in Toulouse.

TOURS

Jardin Botanique de Tours

1 Boulevard Tonnellé, Tours, France

Established: 1842. *Area:* 5 hectares.

Directors:

1. M. Margueron (1849–1852)
2. M. LeComte de Villiers du Terrage (1852–1857)
3. M. Barnsby (1857–1903)
4. M. Henri Lemoine (1903–)

Serves as a public park. Open free daily, 6 a.m.–sunset; in winter 7 a.m.–dark. *Source of income:* Appropriations from the city and the Department. *Plantations:* Systematic (according to the system of DeCandolle), arboretum (180 species), fruticetum (230 species). *Publication:* Catalogue des graines récoltées. *Museum:* Open free, Thursdays and Sundays from noon until 4 p.m.

Note: The Garden is divided into two parts: 1. The scientific part, comprising the school (nursery), and the collection of plants of the world. 2. The horticultural part. There are collections of trees and shrubs, and of annual, biennial, and perennial herbs, all open to the public. In addition, there are five gardens in the city which depend upon this garden for direction and for their supply of decorative plants: 1. Le Jardin Prebaudes d'Oé (about 5 hectares): 2. Le parc Mirabeau (1¼ ha.): 3. Le parc de la Prefecture (1½ ha.): 4. Le jardin du musée (1 ha.): 5. Several squares comprising, all together, a total of about one hectare. There are about 14½ hectares of gardens in the city of Tours having a scientific character, and open free to the public.

VERSAILLES

Jardin Botanique de la Trianon

Established about 1765 by Louis XV. It is said that it was in this Garden that Bernard de Jussieu, for the first time, arranged the growing plants systematically, according to the natural families.

VILLARD—D'ARÈNES

JARDIN ALPIN

L'Université de Grenoble, Grenoble, France

Established: 1899. *Area:* 1600 sq. meters. *Altitude:* 1670 meters. Located just outside the village of Villard-d'Arènes.

Note: The purpose of this Garden was to acclimate and breed forage plants, culinary herbs, and mountain fruits for the advantage of the inhabitants engaged in daily farming. More than 100 kinds of vegetables were cultivated. Abandoned, about 1908.

French West Africa

HANN (DAKAR, SÉNÉGAL)

JARDIN DES PLANTES DE HANN

Germany

BADEN–BADEN

In 1909 Max Leichtlin was maintaining here a private botanic garden.

BERLIN

BOTANISCHER GARTEN UND MUSEUM

Direction des Botanischen Gartens und Museums, Königin-Luise-Strasse 6–8, Berlin-Dahlem, Germany

Established: 1646. In Dahlem since 1909. *Area:* 42 hectares.
Directors:

1. J. G. Gleditsch (1744–1786)
2. K. L. Willdenow (1801–1812)
3. H. F. Link (1815–1851)
4. A. Braun (1851–1877)
5. A. W. Eichler (1878–1887)
6. A. Engler (1889–1921)
7. L. Diels (General Director) (1921–)

Serves as a public park with certain restrictions. Admission is free on Wednesday, Saturday, Sunday and on official holidays; a fee of 25 Pfg. is charged on Monday, Tuesday, Thursday, and

Friday. *The Museum* is open from April 1st to Sept. 30th from 11 a.m. to 2 p.m. on Sunday, and from 10 a.m. to 3 p.m. on Wednesday. From Oct. 1st to March 31st on the first Sunday in the month from 11 a.m. to 2 p.m., and each Wednesday from 10 a.m. to 3 p.m. Guides are furnished to groups of individuals at charges varying from 7 Mk. for 10–30 persons (1 guide and 2 instructors) to 26 Mk. for 91–105 persons (4 guides, 7 instructors). *Source of income:* State appropriations. *Library:* For the use of the staff, University students, and botanists generally. 61,000 volumes and pamphlets. Number of periodicals received, 400. *Herbarium:* About 4,000,000 specimens. *Arboretum and fruticetum:* Together, about 15,000 labeled plants. *Plantations:* Geographic, systematic, arboretum, ecologic, morphologic, genetic, economic (medicinal and otherwise useful), annual flowers. *Periodicals published:* Botanische Jahrbücher für Systematik und Pflanzengeographie. Established by A. Engler, 1881. About 4–5 issues annually. Editor, L. Diels. Notizblatt des Botanischen Gartens und Museums zu Berlin-Dahlem. Established 1895. About 4 issues annually. Offered in exchange. Editor, The Director. Seed List. *Courses of instruction* are given at the Garden in affiliation with the University of Berlin. The affiliated "Botanisches Museum" is an institute of the University of Berlin. Lectures and courses are given for students of that University.

BIELEFELD

Botanischer Garten der Stadt Bielefeld

Director: Gartendirektor Meyerkamp (1936)

BONN A. RHEIN

Botanisches Institut und Garten der Universität

Poppelsdorfer Schloss

BRAUNSBERG

Botanischer Garten der Staatlichen Akademie

Stiftstrasse 4/10

BRAUNSCHWEIG

Botanischer Garten der Technischen Hochschule

Humboldtstrasse 1

Established: 1824 (resp. 1840). *Area:* 1.40 ha.

Directors:

1. F. H. Blasius (1836–1871)
2. W. Blasius (1871–1912)
3. G. Tischler (1912–1917)
4. G. Gassner (1917–1933)
5. Jaretzky (1933–)

Serves as a public park. Open free, daily, except Sundays, 7 (resp. 8)–12; 2–7. *Source of income:* From national government, and the sale of publications, plants, and seeds. *Library:* Combined with the library of the Botanical Institute. Only a few books and journals are in possession of the Garden alone. *Herbarium:* At the Botanical Institute. *Arboretum and Fruticetum,* together, comprise about 700 species. *Plantations:* Systematic, ecologic, arboretum, alpinum. Species cultivated under glass: 1160. *Herbaceous plants* cultivated out of doors: 2000 species. *Publication:* Seed List. *Museum:* Only in the Institute of the Technischer Hochschule. *Supply Material:* Cultivated phanerogamic plants especially for students in pharmacy. Local schools depend upon the garden for all of their material. Beginning with 1913 the Director gives demonstrations of living plants to the students of the Technischer Hochschule.

BREMEN (1)

Botanischer Garten

Bremen I, Germany

Established: 1905. *Area:* About 3 ha.
Director: Georg Bitter (1905–?).

Serves as a public park. Open daily, 7 : 30–7 : 30 in winter; 8–5 in summer. Admission, 1–2 M. *Source of income:* Private. The garden belongs to the family of the founder, Herr. F. E. Schulte. *Library:* Reference. *Herbarium:* Small. *Plantations:* geographic, economic, ecologic. The garden is laid out from the viewpoint of plant geography, with groups illustrating variation, mutation, hybridization, economic plants, weeds, and biological groups. *Publications:* Contributions, Monographs, Seed List. *Loan collections and supply material:* Schools of the town and the neighborhood get seeds of the Garden for their school gardens.

BREMEN (2)

Botanischer Garten

Hamburgerstrasse 331

Established: 1923. *Area:* About 42 hectares.

Director: E. Nussbaumer. Originally a private enterprise. Since 1923 owned by the City of Bremen. Came under the Park Board in 1937 and is united with the new botanical-zoological Public Park and Rhododendron Park.

BRESLAU

Botanischer Garten der Universität

Göppertstrasse 6/8

Director: Johan Buder (1937)

COLOGNE (SEE KÖLN)

DARMSTADT

Botanischer Garten der Technischen Hochschule

Rossdorferstrasse 140

Established: 1814. *Area:* 43,958 sq. meters.

Directors:

1. J. Hess (1814–1841)
2. Georg Fritz Schnittspan (1841–1866)
3. Eduard Metzler (1866–1867–ad interim)
4. Heinrich Hanstein (1867–1869)
5. Leopold Dippel (1869–1896)
6. H. Schenck (1896–1927)
7. G. Keyl (1927–1928–ad interim)
8. Friedrich Oehlkers (1928–1932)
9. Bruno Huber (1932–1934)
10. Otto Stocker (April, 1934–)

Serves as a public park. Free, daily. *Source of income:* State (Staadt) appropriations; sale of duplicate plants. *Library:* About 30,000 volumes. *Herbarium:* "Many thousand sheets." *Plantations:* Systematic, geographic, ecologic, economic, morphologic. Arboretum. Fruticetum. *Supplies study material* for the Staatlicher Technischen Hochschule.

DOBELN

Botanischer Garten des Knabengymnasiums und der höheren Landwirtschaftsschule

Dobeln, Saxony

Established: 1872. *Area:* 65 acres.

DORTMUND

Arboretum und Städtischer Botanischer Garten

DRESDEN

Staatlicher Botanischen Garten Dresden

Dresden A 16, Stübelallee 2

Established: In the present location since 1890. *Area:* 1.5 hectares.

Directors:

1. Ludwig Reichenbach, until 1879
2. Oscar Brude (1879–1921)
3. Franz Neger (1921–1923)
4. Friedrich Tobler (1924–?)

Serves as a public park. Open free, daily, 7 a.m. to 6 p.m. in summer; 6 a.m. to 4 p.m. in winter. *Source of income:* Governmental appropriations. *Library:* Approximately 600 volumes and pamphlets. *Herbarium:* Quite small. That of the Botanisches Institut der Technischen Hochschule is very large. *Plantations:* Systematic, geographic, economic, morphologic, ecologic, historical. *Publications:* Guide; Small Guide; Samen-Verzeichnis. *Occasional lectures* are given to school children at the garden. *Affiliations:* The Director of the Garden is also Director of the Botanisches Institut der Technischen Hochschule, Dresden.

DUISBURG

Städtischer Botanischen Garten

Schweitzerstrasse 24, Duisburg am Rhein

Director: J. Leibig (1936). Index Seminum.

ERLANGEN

Botanischer Garten der Universität

Schlossgarten 4

Director: Julius Schwemmle. Samenverzeichnis.

ESSEN AM RUHR

Botanischer Garten

FRANKFURT AM MAIN (1)

BOTANISCHER GARTEN DER JOHANN WOLFGANG GOETHE-UNIVERSITÄT

Viktoria-Allee 9

Director: Friedrich Laibach (1936). Index Seminum.

FRANKFURT AM MAIN (2)

PALMENGARTEN DER STADT FRANKFURT

Director: M. Bromme (1936). Samentauschliste.

FRANKFURT AM MAIN (3)

BOTANISCHER GARTEN DER DR. SENCKENBERGISCHEN STIFTUNG

Senckenbergisches Botanischer Garten, Frankfurt a.M., Germany

Established: 1766. *Area:* About 9000 sq. meters.

Directors (Nos. 1–3, Hilfsgärtner):

1. J. H. Bäumert (1767–1814)
2. Johan Becker (1816–1828)
3. G. Fresnius (1828–1867)
4. H. Ohler (1867–1876)
5. Hermann Theodor Gehler (1876–1889)
6. Wilhelm Jännicke (Oct. 1889–Mch. 1893)
7. Martin August Johannes Möbius (1893–1927)
8. Peter Stark (1928–Nov. 1932)
9. Friedrich Laibach (1933–)

Open free, daily in summer, except Sundays. *Source of income:* The Senckenberg endowment. *The Herbarium* is in connection with the museum of the Senckenbergischen Naturforschender Gesellschaft. *Plantations:* Systematic. *Publications: Berichte der Senckenbergischen Naturforschenden Gesellschaft* (since 1903. Nos. 1–X appeared under the title, *Mitteilungen aus dem botanischem Garten z. Frankfurt a.M.*). Seed List. *Museum:* The museum of the Senckenb. Naturf. Gesellschaft. *Loan collections:* The Museum has loan collections of herbarium specimens, dried seeds, alcoholic material, microscopic slides, economic plant products, photographs. *Study material:* Living material of cultivated phanerogamic, and of cryptogamic plants, is supplied to public and private schools occasionally when requested.

FREIBURG

BOTANISCHER GARTEN UND BOTANISCHES INSTITUT DER GROSSHERZOGLICHEN BANDISCHEN ALBERT-LUDWIGS UNIVERSITÄT

Schanzlestrasse 9/11, Freiberg, Germany

Established: About 1605 (?). *Area:* About one hectare.
Directors:

J. L. Baader (1767) (regarded as the real founder)
Perlot (1826–1845)
Heinrich Anton de Bary (1860–1867)
Friedrich Oltmanns (1907?–1931)
Friedrich Oehlkers (1932–)

Note: The Institute and present Garden were started in 1931. The Institute buildings were completed in 1913, and the plant houses during 1914.

Publication: Seed List. *Library:* A small library assembled by Perlot, who was the Director. *Herbarium:* About 4000 species, among them some Abysinnian plants collected by Schimper, plants from Australia, and from the Cape. *Arboretum:* One about 150 years old; a later one with trees planted in rays from a central *Paulownia imperialis*. There is also a Fruticetum. *Plantations:* Systematic (according to the system of Endlicher); Economic, Medicinal. *Museum:* A collection of fruits, woods, drugs, etc., used to illustrate lectures.

GERA

BOTANISCHER GARTEN ZU GERA-REUSS

Botanischer Garten, Gera, Reuss-Schleiz (Thüringen), Germany

Established: 1896.
Directors: Robert Leube (1895–1909); G. Hahn (1909–?).

Serves as a public park. Open daily, on week days. *Sources of income:* Endowment; annual appropriations by city. *Herbarium:* In the botanical museum. *Plantations:* Local flora of Gera and vicinity. *Museum:* May be visited with the permission of the director.

GIESSEN

BOTANISCHER GARTEN DER HESSISCHE LANDESUNIVERSITÄT

Brandplatz 4

Director: E. Küster (1936).

GÖRLITZ

Städtlichler Botanischen Garden

Director: Max Geissler (1909).

GÖTTINGEN

Botanischer Garten

Established: 1734. *Area:* 4 hectares.

Directors:

1. Johann Wilhelm Albrecht (1734–1735)
2. Albrecht von Haller (1736–1753)
3. Johann Gottfried Zinn (1753–1759)
4. Rudolf August Vogel (1759–1760)
5. Sigismund August Büttner (1760–1768)
6. Johann Andreas Murray (1769–1791)
7. Georg Franz Hoffman (1791–1802)
8. Heinrich Adolf Schrader (1802–1836)
9. Friedrich Gottlieb Bartling (1836–1875)
10. August Griesebach (1875–1879)
11. Hermann Graf zu Solms-Laubach (1879–1888)
12. Gustav Albert Peter (1888–1923)
13. Georg Bitter (1923–1927)
14. Fritz von Wettstein (1927–1931)
15. Richard Harder (1932–)

Open free, daily. Admission to Greenhouses, 50 pfennig. *Source of income:* Supported by governmental appropriations. *Herbarium:* About 50,000 specimens. *Plantations:* Systematic, geographic, morphologic, ecologic. *Museum* is not open to the public. *Affiliation:* Universität Göttingen.

GREIFSWALD (POMMERN) (1)

Botanischer Garten der Ernst Moritz Arndt Universität

Grimmerstrasse 86/88

Director: E. Leick (1936).

Affiliation: Biologische Station Hiddensee.

GREIFSWALD (2)

Botanischer Garten der Universität

Directors: Dr. Metzner (1936). Samen-Verzeichnis.

HALLE

Botanischer Garten der Martin Luther Universität

Am Kirchtor 1, Halle (Saale)

Established:

The "Hortus Medicus," by Churfürst Friedrich III (April 11, 1698).

The "Fürstengarten" acquired for the University by Chancellor von Hoffmann (September 28, 1787).

The present Garden (1932).

Directors:

1. Georg Ernst Stahl (1698–1715)
2. Michael Alberti (Jan. 10, 1716–Jan. 8, 1749)
3. Christian Karl Strumpf (1749–1751)
4. Andreas Elias Büchner (1751–1769)
5. Philipp Caspar Junghans (1770–1797)
6. Kurt Sprengel (July 17, 1797–1833)
?. Heinrich Anton de Bary (1867–?)
?. Wilhelm Troll (1935)

Source of income: Government grant. *Herbarium:* The Endlicher system. *Plantations:* Systematic (Engler system). *Publication:* Seed Exchange List. *Note:* Friedrichs-Universität Halle, founded in 1502, was united with Wittenberg in 1694. In 1935 it was re-christened "Martin Luther Universität Halle-Wittenberg."

HAMBURG

Botanischer Garten, Hamburg

Institut für allgemeine Botanik, Jungiusstrasse 6, Hamburg 46

Established: 1821. *Area:* 9.4 hectares.

Directors:

1. Johann Georg Christian Lehmann (1821–1860)
2. Heinrich Gustav Reichenbach (1863–1889)
3. Eduard Zacharias (1894–1911)
4. Johannes (Theodor Gustav Ernst) Fitting (1911–1912)
5. Hans Winkler (1912–)

Serves as a public park. Open free to the public, daily, 7 a.m. until dark. *Source of income:* City budget of Hamburg. *Library:* Connected with the Stadts Institut für allegemeine Botanik. *Herbarium:* About 500,000 specimens. *Plantations:* Systematic,

economic, morphologic, ecologic, arboretum, fruticetum. *Publications:* Contributions from the Institut für allegemeine Botanik in Hamburg. Offered in exchange. Seed List (*Index Seminum*). *Museum:* Open daily from 10 a.m. to 4 p.m. *Living material* is supplied regularly to both public and private schools. For this purpose there is a nursery of about 5 hectares from which schools may obtain material free on application. *Affiliations:* Hamburg University.

HANN. MÜNDEN (SEE MÜNDEN)

HEIDELBERG

Botanischer Garten der Universität Heidelberg

Heidelberg, Verlängerte Mönchhofstrasse

Established: 1593. *Area:* 3.9224 Hektar.
Directors: Georg Klebs (1907–1918); Interregnum (1919?); Ludwig Jost (1920–1934); A. Seybold (1934–).

Serves as a public park. Open free daily in summer, 7 a.m. to 6 p.m.; in winter, 8 a.m. to 4:30 p.m. Admission to the conservatories: 25, 15, 10 Pfennig. *Source of income:* Supported by Governmental appropriations through the Kultusministerium. *Library:* Small. *Herbarium:* Number of specimens unknown. *Arboretum and Fruticetum.* *Plantations* arranged in the following sections: Geographic, Systematic, Biologic-morphologic, Arboretum; medicinal plants, poison plants, horticultural plants, Alpine, aquatic and swamp plants, heath plants, cultivated plants. *Publications:* Guide, "Führer durch den Botanischen Garten" by Prof. Jost. Verzeichnis von Samereien. *School classes* are brought to the Garden by their instructors. Study material is supplied to schools on request. *Affiliations:* The Garden is a Department of the University of Heidelberg.

HOHENHEIM BEI STUTTGART

Botanischer Garten der Landwirtschaftliche Hochschule

Hohenheim b. Stuttgart

Established: 1829. *Area:* 4.88 hectares.
Directors: Franz von Fleischer (1837–1878); Oskar von Kuchner 1878–?).

Serves as a public park. Open free, daily, at all hours. *Sources of income:* Annual appropriations by the State; the sale of publications, plants, and seeds. *Library:* Biblioteck des Botanischen

Institutes. Number of volumes more than 3000. *Herbarium:* More than 33,000 specimens. *Plantations:* Systematic, ecologic, economic, arboretum.

INSTERBURG (OSTPREUSSEN)

Botanischer Stadtgarden

Salzburgerstrasse 2 und Georgenhorst

Director: Gartenbau-Inspektor Fritsch (1936).

Planned but not yet accomplished: Rose Garden, Alpine Garden, Arboretum, Pinetum.

JENA

Botanischer Garten der Friedrich Schiller Universität

Established: ?. *Area:* 2.75 hectares.

Directors:

1. Rolfink
2. Schlegel
3. Schelhammer
4. Schenk
5. Baldinger
6. Batsch
7. Voigt
8. Matthias Jacob Schleiden
9. Nathan Pringsheim (1864–1870)
10. Edward Strasburger (1870–1881)
11. Ernst Stahl (1881–?)
12. O. Renner (1936–)

Open daily without charge. Source of income: Appropriations by the State through the University. *Herbarium:* 15,500 specimens. *Arboretum and fruticetum* combined: 2000 species. *Plantations:* Arboretum arranged systematically and geographically. Herbaceous plants, systematically and ecologically.

KARLSRUHE

Botanischer Garten der Technischen Hochschule

Kaiserstrasse 2, Karlsruhe, Baden

Directors: L. Graebener (?–?); L. Klein (?–?); W. Schwartz (1936).

This garden announced by circular dated October, 1910, that it would thereafter discontinue the publication of a seed list and exchange of seeds, since this activity was cared for by the botanic gardens of the three universities of the Grand Duchy of Baden, *viz.*, Heidelberg, Freibourg, and Karlsruhe.

KASSEL

BOTANISCHER GARTEN DER STADT KASSEL

Murchardstrasse 19 b, I

Director: Hermann Schultz (1937). Seed List.

KIEL

BOTANISCHER GARTEN DER UNIVERSITÄT

Düsternbrookerweg 17

Director: G. Tischler (1937). Samenverzeichnis.

KÖLN

BOTANISCHER GARTEN DER HANSESTADT KÖLN

Riehl; Am Botanischen Garten 19, Köln am Rhein

Established: 1892. *Area:* 4 hectares.
Directors: P. Esser (1892–?); H. Siep (1936).

Serves as a public park. Open free, daily, 7–12 a.m., 2–7 p.m. *Source of income:* Annual appropriations from the city. *Library:* Reference only: About 1000 volumes, about 500 pamphlets. *Herbarium:* 3700 species. *Arboretum:* More than 300 species. Fruticetum: More than 800 species. *Plantations:* Systematic, economic, ecologic. Rose Garden, Economic Garden, a Section for Heredity. *Species under glass:* 350. Herbaceous plants out of doors: 2800 species. *Publication:* Seed List. *Lectures* are given at the garden to school children. *Living material,* including flowers, leaves, buds, wild plants, cultivated phanerogamic plants, cryptogamic plants, is furnished regularly to both public and private schools, which depend upon the garden for all of their study material. *Instruction:* Regular courses are offered at the garden with the title, *Biologischer cursus für die Professoren Rheinlands und Westfalens.*

KÖNIGSBERG

BOTANISCHER GARTEN DER UNIVERSITÄT

Besselstrasse 6/7

Director: K. Mothes (March 1, 1935–).

Seed List (Auswahal zum Tausch angebotenen Samereien, Früchte, und Sporen.

KREFELD

BOTANISCHER GARTEN DER STADT KREFELD-UERDINGEN AM RHEIN

Gartenamt der Stadt Krefeld, Nordwall Nr. 84

Director: Noell (1936).

Plantations: Systematic. *Samen Verzeichnis. Arboretum:* Outside the main garden. About 700 species of conifers.

LEIPZIG

BOTANISCHER GARTEN DER UNIVERSITÄT

Linnéstrasse 1, Leipzig C I

Director: W. Ruhland.

MARBURG

BOTANISCHER GARTEN DER UNIVERSITÄT MARBURG

Pilgrimstein 4, Marburg (a.d. Lahn)

Established: 1810–1815. *Area:* 5 hectares.
Directors:

1. Georg Wilhelm Franz Wenderoth (1810–1861)
2. Albert Wigand (1861–1886)
3. Karl Immanuel Eberhard Goebel (1886–1891)
4. Paul Arthur Meyer (1891–1921)
5. Peter Claussen (1922–)

Serves as a public park. Open free all day, week-days; forenoons on Sundays. *Source of income:* The garden is supported by the Prussian state together with the University of Marburg. *Library* of 5000 volumes and 7000 pamphlets is combined with that of the Botanical Institute. *Herbarium:* The exact number of specimens is not known. *Plantations:* There is an arboretum and fruticetum. The plantations are classified as systematic, geographic, economic, ecologic. Number of cultivated species, 6500. *A small museum* is free for the use of docents and students. *Publication:* Verzeichnis der abgebarren Sämereien. *Supplies living material* for study to local schools on request, but does not do so regularly. *Affiliation:* With the University of Marburg. Wenderoth is considered the chief founder of this Garden. There was an earlier garden laid out in 1787 by Konrad Mönch on the Ketzerbach (creek).

MERSEBURG

Alpengarten Zoeschen (formerly National Arboretum)

Zoeschen bei Merseburg, Sachsen

Established: 1896. *Area:* 1.5 hectares.
Director: Dr. Georg Dieck (1934).

Serves as a public park. Open free, daily. Admission on application. *Library:* Small. *Herbarium:* Cryptogams, about 2500; Phanerogams, about 4000. *Plantations:* Geographic, arboretum, fruticetum. *Publication:* Bog and alpine plants. 1900. *Living material* supplied to local schools when requested.

MUNICH (MÜNCHEN)

Botanischer Garten

Karlstrasse 29 (Nymphenburg)

Established: 1st, 1809; 2nd, 1909. *Area:* 18,706 ha. (= 55 Tagwerk).
Directors:

1. Franz Paula von Schrank (1812–1832)
2. Carl Friedrich Philipp von Martius (1832–1854)
3. Interregnum? (1855–1856)
4. Carl Wilhelm von Nägeli (1857–1891)
5. Karl Immanuel Eberhard von Goebel (1891–1930)
6. Fritz von Wettstein (1931–1934)
7. Friedrich Carl von Faber (1934–)

Note: This Garden was completely reorganized, 1911–1914 under the direction of Goebel. *Publication:* Seed List.

Plantations: I. Horticultural Section (*Ziergarten*); II. Ecological Groups, including Ecological division, Alpine plants, Heath, Moor, Dune, Pond, Fern-ravine with Rhododendrons, Plant geography of Bayern; III. Useful, Medicinal, and Poisonous plants; IV. Systematic; Arboretum. *Note:* The Munich Garden is younger than most other German botanic gardens. This, says Goebel (Führer durch die Freilandanlagen des Bot. Garten. in München. 1923), is associated with the fact that it was not until the 19th century that Munich became the seat of the Bayerischer Akademie der Wissenschaften (1807) and later (1826) of the University. From the first the Botanic Garden was an activity of the Academy of Sciences. The first garden (Königlicher Botanischen Garten) had an area of 5.1 ha. (= 15 Tagwerk).

It was laid out by the first director, Prof. Franz Paula von Schrank, and was first opened to the public in 1812. It continued for about 100 years, but deteriorated owning to the encroachment of the city. Nägeli suggested its removal, and this was accomplished by Goebel in 1909–10 (to Nymphenburg suburb).

MÜNDEN (HANNOVERSCH MÜNDEN)

Botanischer Garten Hann. Münden

Werraweg 1, Hann. Münden (Oberweser)

The designation is "Hann. Münden," abbreviation for "Hannoversch Münden." Any other, such as "Hannover-Münden," is incorrect and should not be used.

Director: Moritz Büsgen (1909); E. Jahn (1936). Seed List.
Affiliation: Institut für Botanik der Forstlichen Hochschule.

MÜNSTER

Botanischer Garten der Westfälischen Wilhelms-Universität

Schlossgarten 3

Directors: Carl Correns (?–1915); W. Benecke (1915–June 30, 1935); Walter Mevius (July 1, 1935–).

ROSTOCK IM MECKLINBERG

Botanischer Garten der Universität

Doberanerstrasse 143

Director: H. von Guttenberg (1936). Samenverzeichnis.

SANGERHAUSEN

Rosarium des Vereins Deutscher Rosenfreunde zu Sangerhausen

Rosarium, Sangerhausen

Established: 1903. *Area:* About 40 acres (40 Morgen).
Director: E. Gnau (1903–).

Serves as a public park. Open daily, 6 a.m. "till evening." Admission 30 Pfg. *Source of income:* Annual appropriations by the city, membership dues, admission fees, donations. *City ap-*

propriation: 1932: 6000 M. 1934, nothing. *Membership:* Unclassified, annual dues, 3 M. *Library:* Reference. 100 volumes. *Herbarium* of wild roses. *Plantations:* Rosarium (400,000 rose bushes and rose trees); 9000 varieties garden roses; 1200 wild roses.

THARANDT (BEI DRESDEN)

FORSTBOTANISCHER GARTEN

Cotta-Ban

Director: Bruno Huber (1936).

TÜBINGEN

BOTANISCHER GARTEN DER UNIVERSITÄT

Wilhelmstrasse 5

Director: Prof. Lehmann (1936). Samen Verzeichnis.

WÜRZBURG

BOTANISCHER GARTEN DER UNIVERSITÄT

Klinikstrasse 1

Director: H. Burgeff (1937). Samenverzeichnis.

ZÖSCHEN

BOTANISCHER GARTEN

Gold Coast (Africa)

ABURI

BOTANIC GARDENS

Devoted to both ornamentals and crop plants.

Great Britain

ABERDEEN

CRUICKSHANK BOTANIC GARDEN OF THE UNIVERSITY

The Chanonry, Old Aberdeen, Scotland

Director (Curator): J. R. Matthews (1936).

BIRMINGHAM

Botanical Gardens

Established: 1829. Administered by the Birmingham Botanical and Horticultural Society. (Discontinued?)

BRADFORD

Bradford Botanical Gardens

Botanical Gardens, Lister Park, Bradford, Yorkshire, England

Established: 1903. *Area:* 2 acres.
Director: Michael Malone (1903–)

Serves as a public park; Lister Park, comprising 55 acres, is open to the public at all hours, free of charge. The Botanic Garden (2 acres) is part of and in Lister Park. Lister Park also has a resident Head Gardener. Museum and Picture Gallery are also situated inside the Park. *Source of income:* Bradford City Parks Committee. *Library:* Only a small library. *Herbarium:* In Cartwright Hall, the British Flora. *Arboretum and Fruticetum Plantations:* Systematic, geographic, economic, ecologic. *Museum:* Cartwright Hall in the Park. Open free, 10 a.m. to 5 p.m. *Special lectures* are given to school children.

BRISTOL

Botanic Gardens of the University

Directors: O. V. Darbishire (?–1934); Macgregor Skene (1936).

CAMBRIDGE

University Botanic Gardens

Established: 1762 (on present site 1846). *Area:* 21 acres. An additional 17 acres adjoining belongs to the University, and is now (1934) let in allotments, which are available for future extension.

Director: There is a Director, who is also University Lecturer in Botany, and a Superintendent, who manages the horticultural side of the Garden.

Curators: Before the institution of a Directorship in 1920, the chief official was the Curator, R. I. Lynch, who succeeded Mr. Mudd, the first Curator.

Open free to the public on all weekdays from 8 a.m. until dusk. Plant houses open only during the afternoon. The Garden is open on Sundays to members of the Senate of the University on payment of ten shillings a year, and to non-members of the University on payment of £1 a year. The University reserves its private rights in the Garden by closing it to the public one day in the year. *Plantations:* Systematic, arboretum, fruticetum. *Publications: Index seminum ex horto Cantabrigensis Academiae ad mutuam commutationem propositorum.*

The botanical library, museum, and University Herbarium are located in, and form part of, the Botanical Department of the University (Botany School) under the direction of the Professor of Botany.

Supplies the great bulk of the material used for teaching (approximately 100,000 specimens per year), and a large proportion of that used for research in the Botany School.

Material of all kinds for study is sold to local schools. The plant houses consist of eleven houses open to the public. There are also four "pits" and one plant house not open to the public. In addition to the plantations mentioned above there are a Rock Garden and Bog and Water Gardens. There is a special collection of Bamboos. The plants in the entire garden are arranged according to the natural system of De Candolle.

Affiliations: The Cambridge Botanic Garden belongs to the University of Cambridge and is a department of the Botany School. It is governed for the University by the Botanic Garden Syndicate, consisting of (1) the Governors of the Botanic Garden (viz. the Vice-Chancellor of the University, the Masters of Trinity and St. John's Colleges, the Provost of King's College, the Regius Professor of Physics, and the Professor of Botany, all *ex officio,* and (2) six additional syndics, each appointed for two years, from among the resident members of the Senate (i.e. the whole body of Masters of Arts and other higher graduates of the University having their names on the University Registrar) by Grace (i.e. resolution of the Senate).

The Botanic Garden Syndicate meets once a year, when a report is made to the Senate. It is published in the University Reporter. There is also an Executive Committee which meets at least three times a year to discuss the working and management of the Garden.

CHELSEA (LONDON)

Chelsea Physic Garden

Royal Hospital Road, Chelsea, London, S.W. 3, England

Established: 1673. *Area:* 3½ acres.

Directors (official title "Curator"):

1. Richard Pratt (1677–1680)
2. John Watts (1680–1693)
3. Samuel Dody (1693–1695)
4. Isaac Rand (1720)
5. Philip Miller (1722–1770)
6. William (?) Forsyth (1771–1784)
7. John Fairbairn (1784–1814)
8. William Anderson (1814–1846)
9. Robert Fortune (1846–1848)
10. Thomas Moore (1848–1887)
11. William Hales (1899–)

From 1887 to 1899 no one occupied the position of Curator, the Garden being conducted by three laborers. Upon the transfer of the Garden in 1899, from the Apothecaries Society to the present trustees, the London Parochial Charities, the present curator was appointed.

Open daily to students and visitors upon presentation of a ticket of admission, to be obtained from the authorities free of charge. *Source of income:* Endowment and annual appropriations by the National Government and London University. *Library:* Reference, small, about 400 volumes. *Plantations:* Systematic (Bentham & Hooker system). The Garden is arranged systematically in long rectangular beds, about 6 ft. wide, and over 200 natural orders are represented in the open ground. The greenhouses contain plants of purely botanical interest for the supply of the various types of plant morphology and those of interest historically. *Publication:* Seed List. *Lectures* are given at the Garden, and study material, including flowers, leaves, buds, wild plants, and cultivated phanerogams and cryptogams, is supplied to the University of London, Royal College of Science, and other local schools, when requested. *Affiliations:* The Imperial College of Science, South Kensington, The University of London, and several Polytechnics. The laboratory, built in 1902, is chiefly used for research work by students of the Imperial College of Science, and the Professor of Botany of the college is scientific advisor to the Committee of Management.

DURHAM

Botanic Garden of the University

Established: About 1923.
Director: B. M. Griffiths.

EDINBURGH

Royal Botanic Garden

Edinburgh, 4, Scotland

Established: 1670. *Area:* 60 acres, 3 roods, 5 poles.
Directors (official title, Regius Keeper):

1. James Sutherland (1699–1714)
2. William Arthur (1715–1716)
3. Charles Alston (1717–1760)
4. John Hope (1761–1786)
5. Daniel Rutherford (1787–1819)
6. Robert Graham (1820–1845)
7. John Hutton Balfour (1846–1880)
8. Alexander Dickson (1881–1887)
9. Isaac Bayley Balfour (1888–1922)
10. William Wright Smith (1923–)

Serves as a public park. Open free, daily, from 9 a.m. on week-days, and from 11 a.m. on Sundays, until sunset. Plant houses are open from 1 p.m. to 5 p.m., or until sunset if this be earlier. *Source of income:* One of three gardens maintained in the state by the United Kingdom. (The other two are the Royal Gardens at Kew, and the Glasnevin Garden, Dublin). *Library:* Reference. Over 60,000 volumes. The leading botanical and horticultural periodicals are taken. *Herbarium:* Contains a fair representation of the Floras of the world. Specially rich in Asiatic Floras. *Plantations:* Arboretum, Woodland Garden, Rock Garden, Rhododendrons, Systematic (Herbaceous garden and herbaceous border. Bentham and Hooker, Genera Plantarum). *Publications:* Royal Botanic Garden, Edinburgh—a brief descriptive and illustrated account. Map, Key, Plan and Index to the Royal Botanic Garden. Royal Botanic Garden, Edinburgh with Key Plan. Notes from the Royal Botanic Garden, Edinburgh (published periodically). Seed List (annually). *Museum:* Contains a series of exhibits illustrating the form and life histories of plants, arranged so as to facilitate their use in teaching. Open week-days from 9 a.m. to 5 p.m.; on Sundays from 1 p.m. until sunset. *Lectures:* The Regius Keeper, from time to time, gives lectures which are open to the public. *Supply material:* Specimens for private study are supplied, as far as the resources of the Garden will permit, to visitors and students who make written application to the Regius Keeper. Application forms may be obtained at the office of the garden. *Affiliations:* For more than a century and a half the offices of Regius Keeper of the Botanic Garden and Professor

of Botany in the University of Edinburgh have been held by the same person, and it has become the custom that the students of the University go to the garden for instruction in botany. *Instruction:* Special instruction in the sciences underlying the practice of horticulture and forestry is provided for the staff of the garden. The course of instruction is spread over three years, and consists of lectures upon, and practical instruction in, the sciences taught. A reading room and library is also provided for members of the staff taking this course.

Notes: In 1670 a small area, St. Ann's yards, south of Holyrood House was maintained by two physicians, Andrew Balfour and Robert Sibbald, as a Physic Garden. James Southerland was appointed to the "Care of the Garden." This was the foundation of the Royal Botanic Garden of Edinburgh, the real ancestor of the present Garden, which is (next to Oxford, 1632), the oldest in Great Britain.

"In 1676 the same physicians acquired from the Town Council of Edinburgh a lease of the Garden of Trinity Hospital and adjacent ground for the purpose of a Physic Garden in addition to the Garden already existing at Holyrood, and they appointed the same James Southerland (16??–1715) to be 'Intendant' of this Garden." This has been referred to as the Town's Botanic Garden. Part of the site is now occupied by the Waverly Station of the North British Railway. 'Physic Garden Street' is all that now remains as a reminder of this Garden.

"In 1699 the King's Garden, at Holyrood House, also became a Physic Garden, so the connection of the Royal Botanic Garden with the Crown goes back to this period. These gardens were laid out in formal beds devoted to native and foreign plants as well as medicinal herbs, arranged systematically. In 1789 both original gardens were abandoned and combined in a new Garden near Hoddington Place, off Leith Walk. The plants were here arranged after the then new system of Linnaeus.

"In 1702 another Botanic Garden was established in Edinburgh adjacent to the College grounds, "apparently on the site of the present South College Street. This was the College Garden, and of it James Southerland also became custodian."—*Anon. The Royal Bot. Gdn., Edinburgh, with Key and Plan. Edinburgh, June, 1912.*

Note: In 1761 John Hope became King's Botanist at Holyrood and subsequently Professor of Botany and Materia Medica at the University. He soon secured the separation of this chair into two and, as Professor of Medicine and Botany, he initiated (1776) the movement for a new Botanic Garden on the outskirts of the City west of Leith Walk, combining the collections at Holyrood and the Town Gardens, and obtained from the Crown a permanent endowment for the new Garden. Under J. H. Balfour the Garden was transferred to the better site which it now occupies.

By 1823 the growth of the collection necessitated a larger site and the Garden was removed to Broompark or Quacaplesink of 14 acres, part of Innerleith property. Adjacent areas were added in 1865 and 1876. The Arboretum was initiated about 1881.

GLASGOW

Corporation of Glasgow Botanic Gardens

Established: 1818. (Royal Charter 1817; opened to the public 1819. They became public property in 1891).

Directors:

1. William Joseph Hooker (1820–1841)
2. John Hutton Balfour (1841–1845)
3. Walker-Arnott (1845–1868)
4. Alexander Dickson (1868–1879)
5. Isaac Bayley Balfour (1879–1884)
6. Frederick Orpen Bower (1885–1924)
7. James Montagu Frank Drummond (1925–Sept. 30, 1930)
8. John Walton (1930–)

HOLBORN

(Now part of London)

The "botanic garden" of John Gerard, author of "The herball, or generall historie of plantes. Gathered by John Gerarde, of London." 1st ed. 1597. (See South Lambeth.)

Established near the close of the 16th century.

Publication: Catalogus arborum, fruticum ac plantarum tam indigenarum, quam exoticarum, in horto Johannis Gerardi . . .

nascentium. London, Hatfield. 1599. 22 p. This is stated to be the earliest known catalog of any one garden.

HULL

The *Gardeners' Chronicle* for May 12, 1877 (p. 596) states as follows:

"The town of Hull was one of the first to establish a public garden for the instruction and recreation of its inhabitants, and the Hull Botanic Garden has long enjoyed a well earned reputation. . . . Curator, J. C. Niren, during many years." Area: 6 acres. The site became unfavorable owning to the growth of the City ("smoky atmosphere," etc.), and "the proprietors" decided to discontinue the Garden. In 1877 they purchased a new site. "The capital of the new company is proposed to be £30,000 in 3000 £10 shares." Besides recreational and horticultural features, "a goodly extent of ground is to be devoted to botanical purposes. A collection of hardy plants, arranged in their natural orders, is intended to be introduced." A lecture hall, museum, and botanical library were part of the plan. We have been unable to obtain later information.

KEW

Royal Botanic Gardens

Kew, Surrey, England

Established: 1841. *Area:* 288 acres.

Directors:

1. Sir W. J. Hooker (1841–1865)
2. Sir J. D. Hooker (1865–1885)
3. Sir W. T. Thiselton-Dyer (1886–1905)
4. Lt. Col. Sir D. Prain (1905–1922)
5. Sir A. W. Hill (1922–)

Serves as a public park, open every day in the year, except Christmas Day. Hours: 10 to sunset, or 8 p.m. Plant houses open from 1 to 5 p.m.; also mornings on Students' Days (Tuesdays & Fridays). Charge for admission 1 d. (6 d. Students' Days). *Source of income:* Government. *Library:* Reference, about 44,000 volumes. Current periodicals regularly received, approximately 700. *Herbarium:* About 4,000,000 specimens. *Ar-*

boretum & fruticetum, together: 7000 species and varieties. *Plantations* arranged systematically. Species and varieties under glass: 13,000. Herbaceous plants out of doors: 8000.

Publications:

Bulletin of Miscellaneous Information (Generally known as the "Kew Bulletin"). Ten numbers issued per year. To be obtained from His Majesty's Stationery Office, or from the Curator of the Gardens. The price of the annual volume at the present time (1934) is about 15 shillings, plus postage.

The Botanical Magazine. Quarterly. Edited by the Director. Price 17/6 per part net; annual subscription 63/– net. Consists of hand-colored figures and descriptions of plants raised and flowered in the Royal Botanic Gardens, Kew, and other botanical establishments and private gardens. Published by Bernard Quaritch, Ltd. 11, Grafton St., New Bond Street, London, W. 1.

Hooker's Icones Plantarum: Contains figures with descriptions of new or rare plants, of which specimens are contained in the herbarium of the Royal Botanic Gardens, Kew. Edited by the Director for the Bentham-Moxon trustees. Each volume contains 100 plates. Issued in four parts. Price, 10s per part. Published by Dulau & Co. 32 Old Bond Street, London, W. 1.

Official Guides to the Gardens and to the Museums of Economic Botany and North Gallery; Catalogue of Portraits of Botanists; Hand lists of the various classes of plants cultivated at Kew, pictorial postcards, obtainable from Kew or from His Majesty's Stationery Office.

Flora Capensis. Flora of Tropical Africa. Flora of British India. Index Kewensis Plantarum Phanerogamarum. Flora of West Tropical Africa.

Museum: The four museums of Economic Botany and the North Gallery (paintings of plants by Miss Marianne North) are open free daily (except on Christmas Day) from 1 to 5 p.m. or dusk. *Lectures:* No public lectures are given to school children or to the public, and living material for study is not supplied to schools. Museum duplicates of economic plant products are distributed free to schools. Instruction is confined to the courses for the training of young gardeners, including systematic botany, geographical botany, economic botany, and plant pathology. *Research Students* (other than staff): About 200 a year.

LIVERPOOL

Liverpool Botanic Gardens

Edgelane

Established: On present site, 1836. Previously on another site. Under Liverpool Parks and Gardens Committee.

LLANDUDNO

Llandudno Public Gardens

Town Hall, Llandudno, Caernarvonshire, North Wales

Established: 1910. *Area:* Approximately 350 acres.
Governors: Chairman and Pleasure Grounds Committee.
Superintendents:

1. Axtel (1910–1920)
2. Humphreys (1920–1925)
3. Robertson (1925–1934)
4. William Beresford Pritchard (1934–)

Source of income: Local rates. *Publications:* Hand Book of Plants grown.

LONDON

Royal Botanic Society's Gardens (*Discontinued*)

Established: 1838. The Society was granted a Royal Charter in 1839 and took over the site of the gardens the previous year.
Area: Nearly 20 acres.

Note: This Garden ceased to exist when the lease of the Gardens in Regent's Park expired, in April, 1932. Before this the following information was supplied; it now has historic interest.

Directors: Managed by a Council of Fellows of the Royal Botanic Society of London. The President of the Society (1932) was The Right Hon. The Viscount Lascelles, K.G., D.S.O.

Open every week-day to fellows and orders, from 9 a.m. until sunset; on Sundays at 9:30 a.m. Open to the public on Mondays and Thursdays on payment of one shilling. *Sources of income:* Fellows' subscriptions and entrance fees, and also by Parties, Tennis, and various minor sources. *Library:* Reference, 2000 volumes. Over 2000 pamphlets. Current periodicals received: 30. Devoted largely to economic botany, including agriculture

and horticulture. *No regular herbarium. Plantations:* Arboretum. Many fine, rare trees. Herbaceous plants arranged in natural orders in students' garden; elsewhere arranged for ornament. Economic, medicinal, and kitchen gardens, and rock garden. Species under glass: Varied collection. *Publications: Masterly Summary,* succeeding the *Botanical Journal of the Royal Botanic Society.* Issued quarterly; offered in exchange; subscription, 1 shilling. Discontinued. *Museum:* Open free to all visitors to the gardens from 9 a.m. to 5 p.m. Contained important collection of economic plant products. *Lectures:* Free public lectures were given during the summer. *Living material,* including wild plants, was supplied to both public and private schools gratuitously, when requested. Throughout its history this Garden rendered extensive services to students, 600–800 students' tickets being issued annually as early as the 'eighties of the last century. *Practical Gardening School:* Established, 1897. A full course of instruction was arranged for three years, which aimed to give the pupils a practical insight into all the operations of gardening and horticulture. Diploma. "Lady gardening students" were first admitted in 1904 and reached a total of 22 in 1922. *The large Conservatory,* built in 1845, enclosed an area 220 feet long and 75 feet wide. Total area under glass was about 33,000 square feet. This is said (*Nature* **110.** 185–187. Aug. 5, 1922) to be "the first large iron house built in England, the palm-house at Kew being constructed later."

OXFORD

Oxford University Botanic Garden

Department of Botany, Oxford University, Oxford, England

Established: 1621 (By the Earl of Danby). *Area:* 5 acres.

Directors (Professors):	*Custodians:*
	(John Tradescant, Jr., appointed, but never took office on account of his death in 1637 or 1638)
1. Robert Morison (1669–1683)	Jacob Bobart, Sr. (1632–1679)
2. Jacob Bobart, Jr. (1683–1719)	Tilleman Bobart?
3. Edward Sandys (1720–1724)	
4. Gilbert Trowe (1724–1734)	

5.	John Jacob Dill (Dillen, Dillenius) (1734–1747)	G. D. Ehret (1750–)
6.	Humphrey Sibthorp (1747–1784)	James Benwell (Gardener) (?)
7.	John Sibthorp (1784–1795)	
8.	George Williams (1796–1834)	J. Foreman (?–1812)
9.	Charles Giles Bridle Danberry (1834–1867)	William Baxter (1813–1851)
10.	Marmaduke Alexander Lawson (1868–1883)	
11.	Isaac Bayley Balfour (1884–1888)	William H. Baxter (1851–1887)
12.	Sidney Howard Vines (1888–1919)	
13.	Frederick Keeble (1920–1926)	W. G. Baker (1888–)
14.	Arthur George Tansley (1927–)	

Publication: Seed List (One of the first—circa 1685). *Open to the public daily* without charge. *The first greenhouse in England* was erected in this garden in 1734. The tercentennary was celebrated June 23, 1923.

READING

Agricultural Botanic Barden of Reading University

The University, Reading, England

Established: 1918. *Area:* 2 acres.
Directors:

1. John Percival (1918–1932), who established the Garden
2. William B. Brierley (1932–)

Most of the Garden "is laid out in small plots separated by grass paths, the remainder being covered by two bird-proof cages, each of approximately 950 sq. yards in extent.

"The plots contain the chief forage plants and root crops of Western Europe, together with their wild prototypes. There are also plots of some of the commoner medicinal, dye, and oil plants which can be grown on farms in the British Isles.

"In the cages, about two thousand varieties of Wheat; all the species of Aegilops; and numerous varieties of Barleys and Oats are grown annually.

"The varieties of Wheat represent all the races and species of Wheat; these, and the Aegilops species were collected by Professor Percival from all parts of the world.

"The garden is of interest to agriculturists, and is invaluable for supplying material for classes in Agricultural Botany. It also enables students to study the agricultural plants in various stages of growth.

"There is a laboratory in the Garden which houses the collection of dried specimens of the cereals, and affords opportunity for research on the plants growing in the garden.

"An herbarium of the varieties of Wheat, and species of Aegilops is kept in the Agricultural Botany Department of the University."

SOUTH LAMBETH (LONDON)

Established, 1629, by John Tradescant, Senior, as a "Physic Garden," in South Lambeth, London, nearly opposite "Spring Lane" on the east side of the South Lambeth road between Stockwell and Vauxhall. Lysons (*Environs of London,* 1: 330) credits this Garden as "one of the first established in this Kingdom." Sir William Watson (Philosophical Transactions of the Royal Society **46**: 160) states that Tradescant's Garden is, except that of John Gerard, author of the "Herbal," probably the first botanical garden in England. Watson listed a few of the plants still surviving in 1749. (See Holborn.)

UPTON

Hortus Uptonensis

Established: 1762. *Area:* About 5 acres.

Note: This garden was established by John Fothergill, a noted physician in London from 1740 until his death in 1780. It was considered at the time as one of the most important in England. The "Green-House" contained "upwards of 3400 distinct species of exotics" (Lettsom, *Memoirs* of Fothergill, p. 39). In the

open "about 3000 distinct species of plants and shrubs." In cooperation with others Fothergill sent a collector to Africa, and secured plants "from all parts of the world." Many American trees he secured from the nursery of one Gray, who, with Peter Collinson, Mark Catesby, and other collectors, had the first nursery in England that specialized in North American trees and other plants.

Hortus Uptonensis was gradually abandoned after the death of Fothergill.

WISLEY

Royal Horticultural Society's Gardens

Wisley, Ripley, Surrey, England

Established: 1904. *Area:* 60 acres.
Directors:

1. S. T. Wright (1904–1914)
2. Frederick William Keeble (1914–1919)
3. Frederick James Chittenden (1919–1931)
4. R. L. Harrow (1932–)

Open daily from sunrise to sunset, to fellows only, of the Royal Horticultural Society. *Sources of income:* Membership dues; private subscriptions. *Library:* Reference only. About 6000 volumes, including private library of Lindley. *Arboretum and fruticetum. Publications: Transactions* (1805–1848); *Journal,* quarterly (1848–) free to fellows; *Schedule of Year's Arrangements,* issued the last week in January of each year; *Report of the Council;* Various Horticultural Pamphlets; Seed List. *Thirty free lectures* are given at the Garden each year. *Courses of instruction* are given daily at the Garden by members of its staff. *Note:* In 1914 this Garden was transferred from Chiswick to Wisley. S. T. Wright was the last Sup't. at Chiswick.

YORK

The Museum Botanic Garden

The Yorkshire Museum, York, England

Established: 1840. *Area:* 13 acres.
Director: The Keeper of the Museum.

Museum and Garden open daily, 9 a.m.–5 p.m. Admission, one shilling. Local schools free. *Source of income:* Yorkshire Philo-

sophical Society. *Library:* 1000 volumes. *Herbarium:* approximately 20,000. *Plantations* not classified. *Publication:* Catalog of British Plants in the Herbarium. *Occasional lectures* are given to school children.

Greece

ATHENS (MODERN) (1)

Botanic Garden of the University (Botanikon Ergasthrion tou Ethnikou Panepisthmiou)

104 Solon Street

Established: 1835. *Area:* 5 acres.

Directors:

1. C. Fraas (1835–1848)
2. M. Orphanides (1849–1882)
3. Th. Aphentoulis (1883–1892)
4. S. Miliarakis (1893–1917)
5. Jean Politis (1918–)

Source of income: Budget of the University. *Library:* The common library of the Department of Botany, Botanic Garden, and Museum, 6000 volumes. *Herbarium:* "Contains all native plants of Greece and many others." *Plantations:* Systematic. *Museum:* Open free daily, 10–12 a.m.; 4–7 p.m. *Lectures to school children* are given occasionaly, but no material is supplied to schools. *Note:* Theodore Heldreich was curator (Ephoros) of the Garden from 1851 to 1902.

ATHENS (ANCIENT) (2)

The Botanic Garden of Aristotle and Theophrastus

Established: About 340 B.C.

It is stated by several historians of general science and of botany, both ancient and modern, that Aristotle's garden, where he taught at Athens, was bequeathed by him to his pupil, Theophrastus. A careful study of the wills of both Aristotle and Theophrastus fails to confirm this.

In the Life of Theophrastus (Diogenes Laërtius V. Bohn Ed. London, 1853. pp. 195–196) it is stated as follows: "It is said, too, that he [Theophrastus] had a garden of his own after the death of Aristotle, by the assistance of Demetrius Phalerius, who was an intimate friend of his." This has been interpreted (with other evidence?) that this garden was bequeathed to Theophrastus by Aristotle, but Aristotle's will (Diogenes Laërtius, V. pp. 185–

186 Bohn Ed.) makes no mention of Theophrastus except to name him as one of five "guardians of my children and of Herpyllis, and the trustees of all the property I leave behind me." The will appears to provide that, if Nicanor shall marry Aristotle's daughter the trustees shall turn the property over to him. "But if anything should happen to Nicanor, which may God forbid, either before he receives my daughter in marriage, or after he has married her, or before he has any children by her, then any arrangements which he may make by will shall stand. But, if Theophrastus, in this case, should choose to take my daughter in marriage, then he is to stand in exactly the same position as Nicanor." Laërtius does not say whether or not Theophrastus married the daughter of Aristotle and thereby acquired any of Aristotle's property.

Theophrastus mentions his garden several times in his will and leaves it to such of his friends as "choose to hold a school" in it. The Greek text (and Latin translation in parallel columns) of the wills of Aristotle and of Theophrastus may be found in *Scriptorum Graecorum Bibliotheca.* Paris. 1862.

Haiti

DAMIEN

(Near Port-au-Prince)

Bureau de Botanique, Service National de la Production Agricole et de l'Enseignement Rural, Port-au-Prince, Haiti

Director: Frederic Kebreau, Chief, Division of Botany and Plant Pathology.

Note: Under date of March 6, 1937, we were informed as follows: "It is our plan to organize a small botanic garden at Damien, near Port-au-Prince. We are just assembling information and making plans, but the botanic garden is not yet established."

Hong Kong

HONG KONG

Hong Kong Botanic Gardens

Superintendent, Botanical & Forestry Department, 1 Peak Road, Hong Kong, China

Date opened: June 8, 1864. *Area:* 9 acres, extended by 8.2 acres in 1871.

Directors:

1. T. G. Donaldson (1861)
2. Charles Ford (1871)
3. S. T. Dunn (1903)
4. W. J. Tutcher (1910)
5. Harold Green (1920)
6. G. B. Twemlow, Acting Superintendent, 1934

Serves as a public park. Admission free, at all hours of the day. *Source of income:* Practically nil as of 1934. The garden is supported by governmental appropriations. *Library:* Approximately 2000 volumes. *Herbarium:* Approximately 40,000 specimens. *Publication:* Annual Report of the Botanical & Forestry Department.

Hungary

BUDAPEST

Hortus Botanicus Universitatis Budapestinensis

Romanelli utca 25, Budapest VIII

Established: 1771. *Area:* 4 ha.

Directors:

1. J. Winterl (1771–1810)
2. P. Kitaibel (1810–1816)
3. J. Schuster (1816–1817)
4. C. Haberle (1817–1834)
5. J. Sadler (1834–1849)
6. J. Gerenday (1849–1862)
7. F. Linzbauer (1862–1866)
8. L. Jurânyi (1866–1897)
9. A. Mágócsy-Dietz (1897–1928)
10. J. von Tuzson (1928–)

Serves as a public park; open week-days 8 a.m. to 6 p.m.; Sundays 8 a.m. to 12 noon. Admission 10 fillérs. *Source of income:* Donation from the State. *Library:* 6353 volumes. *Herbarium:* 300,000 specimens. *Plantations:* Systematic, geographic, economic, ecologic. A small Arboretum and Fruticetum. *Publication:* Index Horti botanici Universitatis Budapestinensis. *Museum:* Hours are: 9 a.m. to 1 p.m. week-days, and from 3 to 6 p.m. on Sundays. Admission by permit of the Director. *Lectures for school children* are given. Supplies living material for study purposes to local schools. *Affiliations:* With the Institute for systematic Botany and Phytogeography of the Péter Pázmány University of Budapest.

DEBRECEN

Botanic Garden of Stefan Tisza University

Director: Soó de Bere.

Note: In 1935–1936 the new Botanic Garden was opened, including a systematic-morphologic section, Alpine Garden, Garden-laboratory, and greenhouses.

SOPRON

Botanic Garden of the Forestry Division of the Palatin Joseph University

SZEGED

Botanic Garden of the Hungarian Franz Joseph University

(Egyetemi Füveszkert)

Baross-utca 2, sz. I, Egyetemi Növénytani

Ungarn (Hungary)

Director: I. Györffy. Index Seminum.

India

BARODA

Laxmi Vilas Palace Garden and Makaspura Garden

Established: 1885. *Area:* 1200 acres.

Directors (official title, Superintendent, State Gardens):

1. G. H. Krumbiegel (1885?)
2. B. F. Cavanagh (?)
3. T. R. Kathavala (1911?)

Serves as a public park. Open free to the public daily, 5 am.–11 p.m. *Source of income:* State appropriations, and the sale of plants and seeds. *Library:* Small. Arboretum and fruticetum reported as containing "lots of trees and shrubs." *Plantations:* Systematic. Seed List. *Museum:* Open free daily, except "half Sunday." *Loan collections* for school use: Herbarium specimens, dried seeds, microscopic slides, economic plant products, and photographs. *Living material for study,* including wild plants, is supplied to both public and private schools, which depend upon the garden for all of their study material. *Affiliations:* Baroda College, High School, Girls School, Branch School, Male Training College, private schools.

BASSEIN (NEAR BOMBAY) (*Discontinued*)

Botanical and Agricultural Station, Bassein

Established: 1906. *Area:* 90 acres.
Directors: 1. G. S. Gammic (1906–1908); 2. William Burns (1908–1912)

Source of income: Annual appropriations by the national government, and sale of publications, plants, and seeds. *Library:* Reference only. *Plantations:* Systematic, economic, arboretum, fruticetum. *Publication:* Annual Report. *Note:* This garden was given up on April 1, 1912, and only a few men retained to keep the place in order until its future was definitely settled.

BENGALORE

Government Botanic Gardens

Lah-Bagh, Bengalore, India. Seed List.

BOMBAY

Victoria Botanic Gardens

CALCUTTA

Royal Botanic Garden, Calcutta

Sibpur, near Calcutta, British India

Established: 1787. *Area:* 273 acres.
Directors: (Superintendents)

1. Lt. Col. Robert Kyd, Founder (1787–1793)
2. William Roxburgh (1794–1814)
3. Francis Buchanon (afterwards Sir Buchanon Hamilton) (1814–16)
4. Nathaniel Wallich (1817–1846)
5. William Griffith (Offg.) (1846–1848)
6. McClelland (Offg.) (1848–)
7. Hugh Falconer (1848–1855)
8. Thomas Thomson (1855–1861)
9. Thomas Anderson (1861–1868)
10. C. B. Clarke (1869–1871)
11. Sir George King (1871–1897)

12. Sir David Prain (1897–1905)
13. Col. A. T. Gage (1906–1923)
14. C. Calder (1923–)

Source of income: Total amount of the budget for the garden (1934) is: Rs 1,31,531/–, Botanical Survey of Indian—Rs 41,-900/– and Cinchona Cultivation (Government of Bengal)—Rs 3,84,000/– Cinchona Cultivation (Government of India)—Rs 1,-38,100/– —total Rs 6,95,531/–.

Library: There is an up-to-date library of the Botanical Survey of India in the Indian Museum. The Curator, Industrial Section, who mainly deals with applied botany, is also the librarian of the Botanical Survey of India.

A library is also maintained by the Royal Botanic Garden, consisting of 25,000 volumes and numerous pamphlets, which is chiefly meant for reference work and books are sent on loan to recognized botanists throughout India. The Curator of the Herbarium, Mr. K. Biswas, M.A., presently serving (1934), is also the Librarian of the Royal Botanic Garden, Calcutta.

The Herbarium was started, since the foundation of this Garden, by Dr. William Roxburgh, the "Father of Indian Botany," who was appointed the first official Superintendent of the then East India Company's Garden, at present known as the Royal Botanic Garden, Calcutta, in 1793. The present damp-roof and fire-proof structure was erected by the late Sir George King in 1883. It is arranged in scientific order and contains a complete collection of dried specimens of the plants of the Indian Empire as also a fair collection of those of Asia outside India, and of Europe and Australia. The plants of Africa and America are far less perfectly represented. To the systematic botanist this well known herbarium is one of the best of its kind in Asia. Approximate number of specimens is about 2,500,000. Present curator, Mr. K. Biswas, M.A., has charge of the scientific part of the work and botanical exploration in different parts of the country. Loaning of specimens and exchange of herbarium materials are systematically carried on with botanists of different institutions all over the world.

Plantations: Geographical, containing fairly good representatives of the tropical plants of the world. The total number of trees and shrubs is about 1500. There is a large number of herbaceous specimens and grasses which are not counted. There are several ferneries, orchid houses and plant houses where valuable exotic palms, orchids and ferns are systematically cultivated. There is also a large nursery in which horticultural experiments are carried on in a limited manner. A regular supply of plants and seeds is made to local people interested in horticultural gar-

dening. Considerable exchange relations are carried on with the different gardens of the world. Mr. W. Mitra, N.D.H., F.R.H.S., R.D.H., F.L.S., is the Curator of the Garden, who is in charge of the gardening operation and labor force numbering about 200.

Publications: Scientific publications of the Royal Botanic Garden, Calcutta, as also of the Botanical Survey of India are: 1. The Annals of the Royal Botanic Garden, Calcutta, consisting of monographs of families and genera; 2. Shorter accounts of the botany of the different areas of India are published in the Records of the Botanical Survey of India; 3. The Annual Reports of the Royal Botanic Garden, Calcutta, Cinchona Cultivation in Bengal, and Botanical Survey of India are regularly published at the end of each year.

There is no arrangement for public lectures but instructions in arboriculture are given free of charge by the members of the staff to the officers of the Municipalities and Public Works and other Departments.

Note: The Administrative Head of this Garden is the Government of Bengal, Agriculture & Industries Department. The Oficer-in-charge of this Garden is the Superintendent, Royal Botanic Garden, Calcutta. The Superintendent, Royal Botanic Garden, is also the Head of the Department of Cinchona Cultivation of the Government of Bengal and the Government of India, as also the Quinine Factory of the Government of Bengal. Under his charge are also the Lloyd Botanic Garden, Darjeeling, in the Sikkim Himalayas and a few other Calcutta Gardens. The Royal Garden is again the headquarters of the Botanical Survey of India under the Government of India. The Superintendent of the Royal Botanic Garden, Calcutta, is Ex-officio Director, Botanical Survey of India, under whose guidance and control the Botanical explorations of the Indian Empire are carried on by his staff.

The Industrial Section of the Indian Museum is also under the Government of India and its control is under the Director, Botanical Survey of India. The superior staff consists of the Industrial Section of the Indian Museum and an Assistant for systematic botanical work. The present Curator, Industrial Section, is Mr. S. W. Bal. The Industrial Section of the Indian Museum is mainly the Museum of economic and applied botanical specimens.

Kyd advocated "establishing a botanical garden, not for the purpose of collecting rare plants (although they also have their uses) as things of mere curiosity or furnishing articles for the gratification of luxury, but for establishing a stock for disseminating such articles as may prove beneficial to the inhabitants as well as to the natives of Great Britain, and which ultimately may tend to the extension of the national commerce and riches"—an emphasis similar to that made by Sir Joseph Banks for Kew.

DARJEELING

Lloyd Botanic Garden

c/o Royal Botanic Garden, Calcutta

This Garden is at Darjeeling, Sikkim Himalayas. See Note at end of Calcutta.

Area: 45 acres. *Plantations* contain a collection of Eastern Himalayan plants. Attempts are also made to grow temperate and alpine species. *Herbarium:* Rich in Sikkim plants. *Library:* About 25,000 volumes and many pamphlets. This is claimed to be the "oldest and best" botanical library in India. Strictly reference, except that books are loaned to other libraries and "recognized botanists" in India.

KIRKEE

Ganeshkhind Botanical Garden

Kirkee (Kirki, Khadki), Poona District, Bombay, British India

Established (Re-established): 1904. *Area:* 80 acres.

Directors: G. A. Gammie (1904–1908); William Burns (1908–?).

Serves as a public park. Open free daily, from sunrise to sunset. *Source of income:* Annual appropriations by the national government; sale of publications, plants, seeds, flowers, bouquets, "greenery," etc. *Library:* Reference, small. *Plantations:* Systematic, arboretum, fruticetum. *Publication: Annual Report. Living material,* including wild plants, is supplied to schools for study. *Affiliations:* The garden is attached to the Agricultural College, Poona, which is affiliated with the University of Bombay.

OOTACAMUND (NILGIRIS)

Government Botanic Gardens and Parks

Director (Curator): F. H. Butcher (?–1936).

POONA

Empress Botanical Gardens

Poona, Bombay, British India

Area: 60.37 acres. *Serves as a public park.* Open free daily, from sunrise to sunset. *Source of income:* Annual grants by the national government, and the sale of flowers, fruits, plants, seeds. etc. *Plantations:* Not formally divided into sections, but a small

area (5.7 acres) is specially devoted to plants of botanical interest. *Publication:* Annual Report. *Educational Work:* Demonstrations in budding, grafting, and other garden operations are given to students of the local government station college, and schools, and to civilians and private cultivators. Study material is supplied, when requested, to schools and colleges for botanical study. *Affiliation:* Government Agricultural College; Agri-Horticultural Society of Western India.

SAHARANPUR (SEHARUNPUR; SHAHJAHANPUR)

GOVERNMENT BOTANIC GARDENS

Saharanpur, United Provinces, India

Established: 1779. *Area:* 168 acres.

Directors:

1. Under Pre-British Government (1779–1817)
2. Govan (1817–1823)
3. Boyle (1823–1831)
4. Hugh Falconer (1831–1842)
5. Jameson (1842–1876)
6. G. F. Luthrie (1876–1887)
7. M. W. Gollan (1887–1904)
8. H. M. Leake (1904–1906)
9. A. C. Hartless (1906–?)

Serves as a public park. Open free daily, from sunrise to sunset. *Source of income:* Annual appropriations by the national government. *Library:* Reference. About 500 volumes and 250 pamphlets. *Herbarium:* Of garden plants only. About 1000 specimens. *Plantations:* Economic, arboretum, fruticetum. *Publications: Annual Report.* Established, 1841. *Bulletins* (occasional). *Note:* The gardens were formerly entirely botanical, subsequently chiefly commercial, and now partly scientific and partly commercial. There is a branch garden at Dehra Dun. *Affiliated* with School of Horticulture.

Indochina (See Cochinchina)

Italy

BOLOGNA

R. ISTITUTO ED ORTO BOTANICO DELL' UNIVERSITÀ DI BOLOGNA

Via Irnerio 42, Bologna

Established: 1534. *Area:* 1 ha.
Directors:

1. Ulisse Aldrovandi (1567–1605)
2. Gio. Corn. Unterwerio (1605–1620)
3. Bartolomeo Ambrosini (1620–1657)
4. Giacinio Ambrosini (1657–1665)
5. Gio. Battista Capponi (1665–1676)
6. Lelio Trionfetti (1686–1722)
7. Giuseppe Monti (1722–1760)
8. Gaetano Monti (1760–1792)
9. Luigi Rodati (1792–1802)
10. Filippo Re (1802) (Quickly resigned)
11. Giosuè Scannagatta (1803–1815)
12. Antonio Santagata (Acting) (1816)
13. Antonio Bertoloni (1817–1869)
14. Giuseppe Bertoloni (1869–1878)
15. Giuseppe Gibelli (1879–1883)
16. Federico Delpino (1884–1893)
17. Oreste Mattirolo (1894–1897)
18. F. Morini (1897–1927)
19. V. Peglione (1927–1929)
20. L. Buscalioni (1929–1936)
21. E. Chiovenda (1937–)

Open to the public daily. *Source of income:* Governmental appropriations. *Library:* 3000 volumes. *Two Herbariums:* Herbarium A. Bertoloni, and Herbarium Caldesi. *Plantations:* Systematic according to the Engler System. *Arboretum. Publication:* "Malpighia." *Museum:* Open free daily. *Study collections* are loaned to schools. The Garden also supplies living material for study to schools. *Note:* Luca Ghini, the great teacher of botany, lectured on simples at Bologna from 1534 to 1544, but, as Meyer states (4: 257), "without the help of a garden."

CAGLIARI

Orto Botanico di Cagliari

Viale Fra' Ignazio da Laconi, N. 11, Cagliari, Sardinia, Italy
Established: First established in 1765, then completely abandoned. Giovanni Meloni-Baille, professor of natural history at the University, agitated for its reestablishment in 1851, and his successor again in 1858, but it was not actually reestablished until 1864.

Directors:

1. Patrizio Gennari (1866–1892)
2. Domenico Lovisato (acting) (1893–1898)
3. Fridiano Cavara (1899–1900)
4. Saverio Belli (1901–1908)
5. Ermanno Giglio-Tos (acting) (1909)
6. Flaminio Tassi (acting) (1910)
7. Leopoldo Nicotra (1911–1914)
8. Giuseppe Falqui (acting) (1915–1920 e 1922–1924)
9. Giuseppe Gola (1921)
10. Giovanni Negri (1925)
11. Giuliana Mameli-Calvino (1926–1929)
12. Renato Pampanini (1930–)

Affiliation: Istituto Botanico della R. Università.

CAMERINO

Orto Botanico dell'Università

Established: 1825. *Area:* About 6000 square meters.

Directors:

1. Vincenzo Ottaviani (1826–1841)
2. Mariano Gajoni (1841–1850)
3. Agostino Reali (1850–1882)
4. Ranieri Reali (1882–1884)
5. ? (1884–1895)
6. Augusto Napoleóne Berlese (1895–?)
7. G. Teodoro (1935)

Note: At the beginning of the 19th century a simple mountaineer collected the plants necessary for the botanical classes at the University. In the reign of Leone II there was instituted the real botanic garden about 1825. Agostino Reali reorganized the garden and erected the greenhouses. *Delectus Seminum.*

CATANIA

Orto Botanico Universitario

Via Etnea 397, Catania (Sicily)

Established: 1847.

Directors: Francesco Tornabene (1847–1892); Pasquale Baccarini (1892–?); R. Savelli (1936).

FERRARA

Istituto Orto Botanico dell' Università

Via del Paradiso, Ferrara

Established: 1771.

Directors:

1. Giuseppe Parolini (1771–1794)
2. Francésco Maria Giacomini (1795–1801)
3. Giacomo Andreasi (1802–1803)
4. Antonio Campana (1803–1832)
5. University closed (1803–1815)
6. Garden attached to Lyceum
7. Francesco Jachelli (1832–1862)
8. Domenico Jachelli (1862–1878)
9. Caro Massalongo (1878–1918)
10. Augusto Begninot (1918–1920)
11. Emilio Carazzoni (1920–1922)
12. Eugenio Baroni (1922–1930)
13. Roberto Savelli (1930–1931)
14. Luigi Buscaglioni } (1931–1932)
15. Carlo Cappelletti }
16. Felici Giselli (1932–)

Source of income: Governmental appropriations. *Library:* About 1200 volumes. *Herbarium:* About 5000 specimens (specially the flora of Ferrara). *Plantations:* Systematic.

FLORENCE (FIRENZE) (1)

Orto e Museo Botanico

(R. Instituto di Studi Superior)

Via Lamarmora 4, Firenze

Established: About 1550.

Note: Cosmo I entrusted the foundation of this Garden to Luca Ghini, who was also the first director of the Garden at Pisa (1547 cir.-1554). No official documents appear to be known which give the exact date of the founding of the Florence Garden. It is known to have been in existence in 1557, having been planted as a garden of simples in the vicinity of San Marco. After a period of neglect it was flourishing again in 1718, under the care of the Botanical Society of Florence. In 1737 a portion of the Boboli

Garden was annexed, and the old Botanic Garden of San Marco became again a garden of simples. In 1783 it was transformed into an agricultural experiment garden. In 1883 the agricultural experiment garden became again an educational botanic garden, and shortly thereafter the botanical museum of Boboli was moved to the San Marco building.

Directors:

1. Giovanni Targioni-Tozzetti (1737–1749)
2. Saverio Manetti (1749–1782)
3. Attilio Zuccagni (1782–1806)
4. Ottaviano Targioni-Tozzetti (1807–1829)
5. Filippo Parlatore (1842–1877)
6. Odoardo Beccari (1878–1879)
7. Teodoro Caruel (1880–?)

Open free daily. Source of income: Municipal appropriation.

FLORENCE (FIRENZE) (2)

Arboreto Tozzi e Siemoni

R. Instituto forestale di Vallombrosa, Firenze

Established: 1886. *Area:* 7 hectares.

Director: Prof. Vittorio Perona (1886–?).

Source of income: Appropriations by the State. *Arboretums:* Two. Total number of species 3500.

GENOA

Orto Botanico della R. Università di Genoa

Corso Dogali 1–B

Established: 1803.

Directors:

1. Domenico Viviani (1803–1837)
2. Federico (Giacinto?) Sasso (1837–1839, interim)
3. Giuseppe de Notaris (1839–1872)
4. Francesco Baglietto (1873–1875, interim)
5. Federico Delpino (1875–1884) (1872–1884 fide Saccardo)
6. Francesco Baglietto (int. 1885–1886)
7. Ottone Penzig (1886–1929)
8. Augusto Béguinot (1929–)

Source of income: Annual appropriations by the national government. *Library:* Reference only. Number of volumes ("very large"), not known. Current periodicals received: 80. *Herbarium:* Number of specimens (very large) not known. *Plantations:* Chiefly systematic. An annex has been recently created for genetic researches. *Publications:* There is no official publication, except for the Catalog of Seeds. The Director publishes "Archivio Botanico per la Systematica, Fitogeografia, e Genetica," at his own expense. *Museum:* Open daily, 9 a.m.–5 p.m. *Lectures* on botany are given in the museum to students of medicine, pharmacy, and natural science of the University of Genoa. *Living material* for study is supplied occasionally when requested, to local public and private schools. *Note:* The building for the Botanical Museum (including museum, lecture room, laboratories, library, and residence of the director), was erected on the grounds of the Garden in 1892, as a gift from Sir Thomas Hanbury. It was inaugurated at the International Botanical Congress, September 6, 1892, and is officially named "Istituto Botanico Hanbury."

LUCCA

Orto Botanico dell'Università

Established: 1819.
Directors:

1. Paolo Volpi (1819–1833)
2. Benedetto Puccinelli (1833–1850)
3. Attilio Tassi (1850–1860)
4. Cesare Bicchi (1860–?)

Publications: Indices Seminum (1851; 1858)

MESSINA

Orto Botanico

Piazza XX Settembre, Messina

Founded: About 1638–1640. *Note:* Pietro Castelli, the first director, founded this Garden between 1638 and 1640. It was suppressed and in decay from 1657 to 1886. Antonio Barzi, appointed professor of botany at Messina in 1879, reestablished the Garden beginning about 1884.
Directors:

1. Pietro Castelli (1638–1656)
2. Garden abandoned (1657–1886)

3. Antonio Barzi (1886–1892)
4. Fausto Morini (1892–?)
5. G. E. Mattei (?–?)

MILANO

Orto Botanico di Brera

Via Brera 18, Milano

Established: 1781.

Directors:

1. Fulgenzio Vitman (1781–1800 circa)
2. Pietro Pratesi (c. 1800–1806)
3. Filippo Armano (1806–1817)
4. Pietro Armano (custodian) (1818–1820?)
5. Giuseppe Acerbi (1817–1826)
6. Giuseppe Balsamo Crevelli (1826–1852)
7. (Various professors of the Lyceum Brera and of the R. Istituto Superiore Agrario) (1853–1870)
8. Francesco Ardissone (1871–?)
9. Ugo Brizi (1937)

Note: Established by Vitman in affiliation with the Lyceum of Brera to aid in the teaching of officinal botany. In 1864 it became affiliated with the R. Istituto Superiore Agrario.

MODENA

Regio Istituto e Orto Botanico della R. Universita di Modena

Viale Regina Margherita, Modena

Established: 1772, by Duke Francesco III d'Este. *Area:* About 3 hectares.

Directors:

1. Gaetano Rossi (1772–1775)
2. Robert Francesco de Laugier (1776–1783)
3. Guiseppe Maria Savani (1783–1798)
4. Francesco Maria Savani (1798–1804)
5. Bonaventura Corti (1805–1809)
6. Marco Antonio Tamburini (1810–1812)
7. Bartolomeo Barani (1812–1814)
8. Filippo Re (1814–1817)

9. Giovanni de Brignoli de Brunnhoff (1818–1856)
10. Ettore Celi (1856–1873)
11. Giuseppe Manzini (1873–1874)
12. Giuseppe Gibelli (1874–1879)
13. Giuseppe Manzini (acting) (1879–1880)
14. Romualdo Pirotta (1880–1883)
15. Antonio Mori (1883–1902)
16. Giovanni Battista De Toni (1902–1924)
17. Augusto Béguino (1924–1929)
18. Emilio Chiovenda (1929–1935)
19. Georgio Negodi (1935–)

Open free to the public only on Royal Statute Day, and on the birthdays of the King and Queen of Italy, from 10 a.m. to 3 p.m. *Library:* Reference. Only for students in the Institute. Pamphlets: About 1400. Current periodicals received: 12. *Herbarium:* 67,000 specimens (18,000 species). *Plantations:* Systematic, arboretum (coniferae, 81 species: other trees, 10 species), fruticetum, 300 species. *Species under glass:* 2192. *Herbaceous plants out of doors:* 1980. *Publication:* Delectus Seminum (irregularly since 1818). *Museum:* A small one, open whenever the Garden is open. *Study collections* of herbarium specimens and dried seeds are loaned to schools. *Note:* At this Garden are the collections of the former director, Prof. De Toni, including his algological herbarium, and a rich collection of works and pamphlets on algae.

NAPLES

Reale Orto Botanico della R. Università

Via Fiora, Naples

Established: 1807? *Area:* 13 ha.

Directors:

1. Michele Tenore (1810–1860)
2. Guglielmo Gasparrini (1861–1866)
3. Giuseppe Antonio Pasquale (ad interim) (1866–1867)
4. Vincenzo Cesati (1868–1882)
5. G. A. Pasquale (1883–1893)
6. Federico Delpino (1893–1905)
7. Fridiano Cavara (1906–1929)
8. Biagio Longo (1929–)

Open free, with a permit, to the public on week days (except holidays), from 9 a.m. to 11:30 a.m., 3 to 4:30 p.m. *Source of*

income: State appropriations. *Library:* Reference only. About 1500 volumes and 5000 pamphlets; 110 current periodicals received. *Plantations:* Arboretum (the largest section), fruticetum, systematic (1813–1815, and 1912–), geographic, economic, school demonstration plants. *Publication: "Bullettino dell'Orto Botanico della R. Università di Napoli."* Established 1898. Offered in exchange. Subscription price 150 lire. *Herbarium:* Tenoreanum, Gussonianum, etc. *Instruction:* Regular courses are given in general botany, pharmaceutical botany, plant physiology, and medical botany (demonstration). To the Garden is annexed the "Stazione Sperimentale per le Piante Officinali," founded in 1928. *Note:* Toward the end of 1662 there existed a pharmaceutical garden (of simples) called the Montagnolo Garden, in charge of the religious house of Saints Annunziata. Professor Petagna, the predecessor of Michele Tenore, kept a small part of the Mt. Olivet garden planted for instructional use. The real botanic garden was authorized in 1796, but not actually established until 1809 under the care of M. Tenore. (*Fide* Saccardo.)

PADUA

Reàle Orto Botanico di Padova

Via Orto Botanico 15, Padua

Established: 1545. *Area:* About 5 acres (20,664 sq. meters).

Note: This was the first Botanic Garden for didactic purposes. The Garden was established by a decree of the Senate of the Republic of Venice enacted June 29, 1545, on the proposal of Francis Bonafede, who first conceived and urged the idea in 1543. Ten years earlier (1533) the same scholar, Professor of Medicine at the University of Padua, proposed and secured the establishment there of the professorship of simples (*Lectura Simplicilum*). This chair, the first professorship of botany in Europe, was founded by a decree of the Venetian Senate, and Bonafede was made the first professor. The Botanic Garden was established primarily to meet the need which Bonafede felt of illustrative material to enrich his lectures.

Directors:

1. Luigi (Aluigi) Squalermo (called Auguillara) (1546–1561)
2. Melchiore Guilandino (1561–1589)
3. Giacom' Antonio Cortuso (1590–1603)
4. Prospero Alpini (Alpino) (1603–1616)

5. Giovanni Prevozio (Prevot) (1616–1631)
6. Giovanni Rhodio (suddenly resigned) (1631)
7. Alpino Alpini (1631–1637)
8. Giovanni Veslingio (Wesling) (1638–1649)
9. Giorgio Dalla Torre (1649–1681)
10. Jacopo Pighi (1681–1683)
11. Felice Viali (1683–1719)
12. Giulio Pontedera (1719–1757)
13. Pietro Arduino (Acting) (1757–1760)
14. Giovanni Marsili (1760–1794)
15. Giuseppe Antonio Bonato (1794–1835)
16. Roberto De Visiani (1836–1878)
17. Pier' Andrea Saccardo (1878–1915)
18. Augusto Béguinot, acting (March 1, 1916–Oct. 15, 1921)
19. Giuseppe Gola (Oct. 16, 1920–)

Open free daily. Source of income: Municipal appropriations. *Library:* More than 15,000 volumes. Founded in 1770 by Giovanni Marsili. Contains one of the largest known collections of portraits of botanists (more than 600), begun by De Visiani and continued by Saccardo. Includes Saccardo's personal mycological library of 300 volumes and some 2400 pamphlets. *Herbarium:* Initiated at the beginning of the 19th century by Bonato. 1. General, more than 60,000 specimens; 2. Dalmatian flora, 10,000; 3. Saccardo's personal phanerogamic herbarium, more than 10,000 specimens representing more than 3500 species; 4. Cryptogamic, comprising the personal herbarium of Saccardo of more than 16,000 specimens. *Affiliation:* University of Padua. *Publication:* Semina, Sporae, Bulbi, et Tuberi quae Hortus Botanicus Patavinus Pro Mutua Commutatione Offert. *Note:* Bonafede is said to have had a garden of simples at Padua as early as 1533, which was financed by the Venetian Senate. Instruction of students began there in 1540. The present Garden is nearly surrounded by the Alicorno Canal which, since 1575, has supplied water for irrigation and for some seventeen fountains.

PALERMO (1)

Orto Botanico della R. Università

Via Lincoln

Established: 1779

Directors:

1. Giuseppe Tineo-Ragusa (Porta Carini) (1779–1789)

2. Giuseppe Tineo-Ragusa (Villa Giulia) (1789–1812)
3. Vincenzo Tineo (1812–1856)
4. Agostino Todaro (1857–1892)
5. Antonio dal Borzi (1892–1921)
6. Luigi Buscalioni (1923–1928)
7. Luigi Montemartini (1928–)

Note: Saccardo states that in 1779 Entichio Barone and Giuseppe Tineo-Ragusa planted a small garden near the fortification of Porta-Carini, Palermo, but that the actual botanic garden, near the Villa Giulia, was not inaugurated until 1789 under the direction of Tineo-Ragusa. A letter from the present (1937) director gives 1880 as the beginning date for G. Tineo-Ragusa.

PALERMO (2)

R. Giardino Coloniale di Palermo

Director: Luigi Montemartini.

PALLANZA

Villa Taranto Botanic Gardens

Villa Taranto, Pallanza (Lago Maggiore)

Established: 1931.
Director: Henry R. Cocker (1937).

Projected: Rock Garden of several acres; Rose Garden with space for 5000 shrubs; Water Garden. *Note:* Privately owned by Capt. N. McEacharn, and still (1937) under construction. The present intention is to present this garden eventually to the Italian nation. Work has been greatly hindered by the Italo-Abyssinian war and resulting "sanctions." Present personnel of 40 is only about one-third of what it would be in normal times. "No plants, seeds, or bulbs may be imported from 'sanctionist' countries. No British periodicals may be received, including horticultural journals, and foreign seed and plant catalogs." There is a training course for gardeners. *Publication:* Seed List.

PARMA (1)

Orto dei Semplici (*Discontinued*)

Established: About 1599.
Directors:

1. Pompilio Tagliaferri (1600?–1639)

2. Lorenzo Porta (1639–?)
3. Ant. M. Bacicalue (1705–1738)
4. Position vacant (1738–1749)
5. Silvestre A. Ponticelli (1749–1769)

Note: The present Botanic Garden at Parma is the successor of the earlier "Garden of simples."

PARMA (2)

Orto Botanico della Regia Universitá

Strada Farini 90

Established: 1770.
Directors:

1. Giovanni Battista Guattari (1769–1793)
2. Bartolomeo Barbieri (ad interim) (1793–1795)
3. Diego Baldassare Pascal (1795–1802)
   (Closed "for political reasons," 1802–1817)
4. Giorgio Jan (1817–1843)
5. Giovanni Passerini (1843–March, 1893)
6. Giovanni Battista De Toni (acting, April–October, 1893)
7. Carlo Avetta (November, 1893–1935)
8. Francesco Lanzoni (in charge, 1935)

Seed List.

PAVIA

Regio Istituto (Orto) Botanico "Giovanni Briosi"

Via S. Epifanio No. 6, Pavia

Established: About 1700. *Area:* 1½ ettaro.

Note: Saccardo says that the Garden of Pavia (*Hortus ticinensis*) did not actually begin until 1774).

Directors:

1. Fulgenzio Vitman (1763–1773)
2. Valentino Brusati (1774–1776)
3. Galli (di Varese) (1777) incaricato
4. Giov. Antonio Scopoli (1777–1788)
5. Domenico Nocca (1788) Supplente
6. Valentino Brusati (1788–1796)
7. Domenico Nocca (1796–1826)
8. Giuseppe Moretti (1826–1853)

9. Sante Garovaglio (1853–1882)
10. Guglielmo Gasparrini (1857–1861)
11. Achille Cattaneo (1882–1883) Supplente
12. Giovanni Briosi (1883–1919)
13. Gino Pollacci (1919–1920) In charge
14. Luigi Montemartini (1920–1926)
15. Luigi Maffei (1926) Supplente
16. Gino Pollacci (1927–)

Source of income: Appropriation by the State, admission fees, sale of publications, plants and seeds. Consorzio Universitario Lombardo, laboratory analyses and determinations, etc. Annual budget for 1934 was 60,000 Lires. *Library:* Reference only. About 50,000 volumes, including 350 periodicals. *Herbarium:* "Many thousand" specimens. *Plantations:* Systematic (after Eichler); geographic, economic, ecologic, local flora. *Publications:* "Archivio Del Laboratorio Crittogamico Italiano" (established in 1874). Discontinued. Some back volumes for sale. "Atti Dell'Istituto Botanico E Laboratorio Crittogamico di Pavia," 2nd–4th Series. *Museum:* Open during the school year. Loan collections for schools of herbarium specimens, dried seeds, alcoholic material, microscopic slides, photographs. *Study Material:* Living material, including wild plants, are supplied to schools and laboratories for study; and living "micotheca" (many species in culture) most of which are fungi living on man and lower animals. *Affiliation:* Laboratorio Crittogamico Italiano, now: R. Stazione Sperimentale Agraria, devoted to the study of pure and applied Cryptogamy.

PERUGIA

Orto Botanico dell'Università

Established: 1811.
Directors:

1. Domenico Bruschi (1811–1854)
2. Alessandro Bruschi (1854–1884)
3. Andrea Batelli (1885–?)

PICCOLO S. BERNARDO (AOSTA)

Giardino Alpina "La Chanousia"

Via Cassia, Tomba di Nerone, Rome

Established: 1897. *Altitude* above sea-level: 2200 meters.
Director: Lino Vaccari.

PISA

Reàle Orto Botanico della R. Università di Pisa

Via Luca Ghini 1, Pisa

Established: ?1544 (C. Fedeli); 1545 or later. (DeVisiani); 1547 (Saccardo).

Directors:

1. Luca Ghini (1547 cir.-1554)
2. Andrea Cesalpino (1554–1558)
3. Luigi Leoni (1558–1582)
4. Lorenzo Mazzanga (1582–1583)
5. Giuseppe Benincasa (o Casabona) (1583–1595)
6. Polidoro Matteini (1595)
7. Francesco Malocchi (1596–1614)
8. Giovanni Rocchi (1614)
9. Domenico Vigna (Acting) (1615)
10. Jacopo Macolo (?Macaulay) 1615–1617)
11. Pancrazio Mazzanga (1617–1625)
12. Matteo Pandolfini (1626–1630)
13. Giacinto Maidalchini (1631–1632)
14. Domenico Vigna (1632–1634)
15. Dionisio Veglia (1634–1636)
16. Claudio Guillermet de Beauregard (called Beriguardi) (1636–1637)
17. Giovanni Le Tellier (1637–1641)
18. Tommaso Bellucci (1641–1672)
19. Pietro Nati (1672–1685)
20. Michelangelo Tilli (1685–1740)
21. Angelo Attilio Tilli (1740–1781)
22. Giorgio Santi (1782–1814)
23. Gaetano Savi (1814–1842)
24. Pietro Savi (1842–1871)
25. Teodoro Caruel (1871–1880)
26. Antonio Mori (Acting) (1880–1881)
27. Giovanni Arcangeli (1881–1915)
28. Biagio Longo (1915–1929)
29. Ugolino Martelli (1929–1930)
30. Alberto Chiarugi (1930–)

Open to the public daily. Note: The questionnaire sent to this Garden was not returned. M. Lavellée, as President of the Société Nationale d'Horticulture de France, delivered an address on August 16, 1882, which is reported in the Gardeners' Chronicle (England), for July 7, 1883. In that address he credits the establishment of a botanic garden in Pisa ("the first botanic garden") to the Grand Duke Cosmo de Medici I, and gives the date as 1543. C. Fedeli (*Atti Soc. Tosc. Sci. Nat. proc. verb.* p. xxvii, pp. 8–20. 1918) states that the Pisa Garden was founded in 1544, "one year before Padua," but Robert De Visiani, Director of the Padua Garden from 1836 to 1878, and his successor, Pier Andrea Saccardo, insist on a later date (subsequent to 1545). Mattiolus, in the Preface to his *Commentaries,* published in 1559, says that it was the new Garden at Padua that inspired Cosmo to found the Garden at Pisa. Pontedera (*Epistolae ac dissertationes,* p. 251) says that Padua, founded in 1545, was the first garden, Pisa later. (*"Primus hortus patavinus existit, qui ab anno 1545 principium ducit, pisanum autem secundum titulus januae superpositus ostendit."*) This question is discussed at greater length in Brooklyn Botanic Garden *Record,* **20**: 1–24. 1931.

PORTICI

Orto Botanico del R. Istituto Speriore Agrario

Ex Palazzo Reale, Portici, presso Napoli

Established: 1872. *Area:* 2 ha.

Directors:

1. Nicola Pedicino (1872–1877)
2. Orazio Comes (1877–1917)
3. Camillo Acqua (in charge) (1917–1918)
4. Francesco De Rosa (in charge) (1918–1919)
5. Alessandro Trotter (in charge) (1919–1923)
6. Giuseppe Zodda (in charge) (1923–1924)
7. Giuseppe Lo Priore (1925–1928)
8. Alessandro Trotter (in charge) (1928–1932)
9. Giuseppe Catalano (1933–)

Herbarium: 20,000 specimens. *Library:* 5000 volumes and pamphlets. *Affiliation:* Facoltà Agraria della R. Università di Napoli.

ROME (ANCIENT) (1)

According to Pliny (Nat. Hist., XX, Chapter 100; XXV, Chapter 5), Antonius Castor, who lived in Rome in the first century A.D., had a botanic garden, which seems to have been the first one in Rome. In Book XXV (Chapter 5) Pliny says that he had the opportunity of visiting this garden in which Antonius, though he had passed his hundredth year, "cultivated vast numbers of plants with the greatest care."

ROME (2)

R. Orto Botanico della R. Università di Roma

Via Milano 75

Established: 1884. *Area:* About 10 hectares.
Directors:

1. Michele Mercati (probably under supervision of Andrea Cesalpino) (1566–1593)
2. Andrea Bacci (Baccio?) (1593–?)
3. Castore Durante (?–1600)
4. Giovanni Feber (supplemented temporarily by Antonio Nanni) (?–1630)
5. Pietro Castelli (1630–1638)
6. Giovanni Benedetto Sinibaldi (1638–?)
7. Domenico Panarola (1646–?)
8. Francesco Sinibaldi (1667–?)
9. Giovanni Battista Trionfetti (1676–1706)
10. Piètro Assalti (1706–?)
11. Antonio Volpi (?–?)
12. Antonio Celestino Cocchi (1726–?)
13. Cosimo Grilli (1728–?)
14. Angelo Marcangeli (?–?)
15. Giuseppe De Panicis (?–1747)
16. F. A. Cinnaneschi (1748–?) (Prof. of theoretical botany)
17. G. F. Maratta (Director, assisted by Lib. Sabbati) (1748–?)
18. Giorgio Bonelli (?–1777)
19. Niccolo Martelli (Director and Prof. of botany) (1777–1805)
20. M. A. Poggioli (Prof. of theoretical botany) (1805–1843)

21. Antonio Sebastiani (Director & Prof. of practical botany) (1813?–1820)
22. Ernesto Mauri (Director & Professor) (1820–1831)
23. Carlo Donarelli (assisted by Giulio Verni) (1831–1851)
24. Pietro Sanguinetti (Professor) (1843–1855)
25. Francesco Ladelci (Professor) (1855–1870?)
26. Ettore Rolli (Professor) (1851?–1870?)
27. Giuseppe De Notaris (1870–1877)
28. Nicola Pedicino (1877–1883)
29. Romualdo Pirotta (1883–1928)
30. Enrico Carano (1928–)

Does not serve as a public park, but may be visited with the permission of the director. *Source of income:* Governmental grant. *Library:* That of the Regio Istituto Botanico di Roma. *Herbarium:* Of cultivated plants only. *Plantations:* Systematic, economic, ecologic. *Publications:* Catalogo del R. Orto Botanico di Roma. Established 1885. Index seminum, sporarum, frutuum. Storia della Botanica in Roma e nel Lazio. The scientific publications of the garden are published with those of the Regio Instituto Botanico in the *Annali di Botanica.* The museum is open during the same hours, and under the same conditions as the garden.

Note: As early as about 1288 there existed at the Vatican a pharmaceutical garden (not for instruction), planted by Simone Genuense, physician to Pope Niccolò IV. Also Niccolò V had a similar garden at the Vatican about 1447, "filled with all kinds of herbs." A true scientific garden for instruction was instituted at the Vatican about 1566 by Michele Mercati, physician of Clement VIII, and a pupil of Cesalpino. The Botanic Garden of Rome was founded at the Vatican, says Saccardo (La Botanica in Italica. Venezia, 1895. p. 193), under Alexander VIII, about 1660, and was under the direction of G. B. Trionfetti. In 1870 the garden was relocated at Via Panisperma, 89B, Rome. Subsequently, its address was Via Milano 75.

SALERNO

Medicinal Plant Garden of Mathoeus Sylvaticus

Dating from 1309. Not now in existence

SASSARI

Orto Botanico

Via Rizzedder

Established: 1888.

Directors: Fausto Morini (1888–1892); Leopoldo Nicotra (1892–?).

Note: An earlier small botanic garden was completely abandoned in 1853.

SIENNA

Orto Botanico della R. Università di Sienna

Via P. A. Mattioli 2

Established: 1784.

Directors:

1. Biagio Bartalini (1783–1822)
2. Giuseppe Giuli (1822–1851)
3. Giovanni Campani (1851–1860)
4. Attilio Tassi (1860–?)
5. Arturo Nannizzi (1937)

Note: In 1588 a professorship of "Simples" was instituted at the University of Sienna by Grand Duke Ferdinand, of Tuscany. The first professor was Adriano Moreschini (1588–1617). The seventh professor, Pirro Maria Gabbrielli (1669–1706), formed about 1684 a herbarium of plants collected in the surrounding fields. This garden was, in time, annexed to the Hospital of S. Maria della Scala. In 1756 the lectureship of simples was discontinued, and three years later there was instituted a course of instruction in Natural History, given by Giuseppe Boldassarri, physician to the Monk superior of Monte Oliveto Maggiore. Boldassarri (1759–1782) had enriched the small Pharmaceutical Garden of that Monastery. Finally, in 1784, Pietro Leopold, Grand Duke of Tuscany, decided to establish at Sienna a true botanic garden, and to transform for that purpose, the Orto dei Semplici annexed to the Hospital of S. Maria della Scala. Biagio Bartalini, who succeeded Boldassarri, became first director of the Orto Botanico, as above indicated. *Seed List.*

TRENTA (GORIZIA)

Giardino Botanico Alpino "Juliana"

TRIESTE

Orto Botanico Communale di Trieste
(Civico Orto Botanico)

Farneto Boschetto N. 861

Established: 1828.

Directors:

1. Bartolomeo Biasoletto (1828–1859)
2. (Garden abandoned, 1860–1878)
3. Raimondo Tominz (1879–?)
4. Carlo de Marchesetti, honorary directory of the Museum of Natural History and director of the Botanic Garden, died April 2, 1926. (Science, **63**: 473. May 7, 1926.)
5. Mario Stenta (as of April 2, 1926)

Note: The Commune of Trieste reestablished this Garden in 1879 to honor the memory of its illustrious citizen, M. Tommasini, and named the Garden after him.

TURIN (TORINO)

R. Orto Botanico dell'Università di Torino

Viale Mattioli 31 (al Valentino), Torino (106)

Established: 1729. *Area:* About 2 ha.

Directors:

1. Bartolomeo Caccia (1729–1749)
2. Vitaliano Dinati (1749–1763)
3. Carlo Allioni (1760–1781)
4. Giovanni Pietro Maria Dana (1781–1801)
5. Giovanni Battista Balbis (1801–1814)
6. Giovanni Biroli (1815–1817)
7. Carlo Matteo Capelli (1817–1831)
8. Giuseppe Giacomo Morris (1831–1869)
9. Giovanni Battista Delponte (1870–1879)
10. Giovanni Arcangeli (1879–1883)
11. Giuseppe Gibelli (1883–1898)

12. Saverio Belli (1898–1900)
13. Oreste Mattirolo (1900–1932)
14. Carlo Cappelletti (Nov., 1932–)

Admission by permission of director. *Source of income:* Governmental appropriations. *Library:* Reference. About 9000 volumes and 5500 pamphlets. *Herbarium:* About 405,000 specimens. *The "Aboretum"* comprises both trees and shrubs. *Plantations:* Systematic, according to Engler. *Publications:* Enumeratio Seminum pro commutatione (Biennial); Labori Esequiti dal Personali Scientifico (Biennial). Cronistoria dell' Orto Botanico della R. Università di Torino, 1792–1929, by Oreste Mattirolo. *Museum:* Comprises: General Herbarium; Herbarium Pedemontanum: Seed Collection (about 4000 tubes containing specimens); A collection of Woodcuts; Models of flowers which can be dismembered for teaching purposes; Dried specimens of medicinal plants. Museum open by permission of the Director. *Affiliations:* The garden is part of the Royal Botanic Institute of the University of Turin (Faculty of Mathematical, Physical and Natural Sciences).

URBINO

Orto Botanico dell'Università

Via Saffi 96, Urbino

Established: 1809.

Directors:

1. Andrea Marcantini (1828–1832)
2. Pietro Camici (da Pistonia) (1832–1860)
3. Antonio Federici (1860–1884)
4. Dante Badanelli (interim) (1855)
5. Giovanni Alberto Mamini (1886–?)

Note: The Garden was first planted in 1809, as an annex to the Lyceum, by Giovanni de Brignoli de Brunhoff, then professor of botany and agriculture, near the convent of St. Francesco. It became affiliated with the University in 1815, especially with the chair of botany of the school of Pharmacy. (Saccardo.)

VALLETTA DI MALTA

Botanic Gardens of the University

La Valletta, Malta

Established: 1675.

Directors:

1. G. Zammit (1675–?)
2. P. F. C. Giacinto (1805)
3. Stefano Zerafa (1827)
4. Giovanni Carlo Grech-Delicata (1850–1870)
5. Gavino Gulia (?–1889)
6. Francesco Debono (1889–?)

Note: Of the Garden established by Zammit, professor in the University of Malta, at St. Elmo in 1675, not a trace is left. In 1805, under the auspices of the English governor, A. J. Ball, there was established a somewhat larger garden under the direction of Giacinto, in the suburbs of Floriano.

VENICE

A Medicinal Plant Garden, dating from 1533, is said to have been established by Gaultieri on a site given by the Venetian state.

VENTIMIGLIA

Handbury Botanic Gardens

Ventimiglia, Italy

Established: 1867. *Area:* 120 acres.

Directors (Curators):

1. Gustav Cronemeyer
2. Curt Dinter
3. Alwin Berger (1912)
4. Joseph Benbow (1920–1923)
5. S. W. McLeod Braggins (1923–?)
?. Mario Ercoli (1936)

Open on Monday and Friday afternoons. Admission fee, 5 Lire. *Library:* Reference only. 2000 volumes. Current periodicals regularly received, 20. *Herbarium:* 30,000 specimens. *Plantations:* Consist entirely of sub-tropical plants, trees, shrubs, and herbs, with a very few species under glass. There is a large collection made by E. H. Wilson in China, and another by Brunnthaler in South Africa. Also representatives from intertropical countries, including Australia, New Zealand, Mexico, and Africa. *Publications:* Alphabetical Catalog, 1889. Edited by G. Cronemeyer. Systematic Catalog, 1889. Edited by G. Cronemeyer. Alphabetical Catalog, 1897. Edited by C. Dinker. Hortus Mor-

tolensis, 1912. Edited by A. Berger. Florula Mortolensis. Seed List (yearly), since 1883. *Museum:* Not public. Admission by letter from Gr. Uff. Cecil Hanbury, M.P. Comprises woods, seeds, fruits, herbarium specimens, and specimens preserved in alcohol. *Living material* for study is supplied to students (but not to schools) occasionally when requestted. 15,000 packages of seeds is a yearly output. *Note:* The money received for entrance fee is given to local charities, foremost among these being the Ventimiglia hospital.

Japan

KASUKABE (SAITAMA–KEN)

MEDICINAL PLANTS GARDEN OF THE TOKYO HYGIENIC LABORATORY OF THE HOME OFFICE

Director: T. Kariyone (1937).

KIOTO

BOTANICAL GARDEN OF THE CITY

Kamigamo

KOBE

BOTANICAL GARDEN OF KOBE

Kobe City Office

Established: A letter of September 18, 1936, from Sakuichi Nishi, Chief, Department of Industry, states that plans were under way to establish "a municipal botanical garden."

KOSHUN

KOSHUN BOTANICAL GARDEN

Koshun, Formosa, Japan

Established: 1902. *Area:* 325 hectares.

Directors (Curators): Yasusada Tashiro (1902–1910); T. Inamura (1910–?).

Source of income: Appropriations by the Imperial Government.

NIKKO (TOCHIGI–KEN)

BOTANIC GARDENS OF THE FACULTY OF SCIENCE

Tokyo Imperial University, Tokyo

Director: T. Nakai (1937).

SAPPORO

Department of Botany, Faculty of Science

Hokkaido Imperial University, Sapporo

Director: Y. Yamada (1936). List of Seeds and Spores.

Note: The Dept. of Botany issues a *Seed List* separately from that of the Botanic Garden of the Faculty of Agriculture. The address should not be confused.

SAPPORO

Botanic Garden of the Faculty of Agriculture

Hokkaido Imperial University

Directors: Kingo Miyabe (?); S. Ito (1936); Y. Tochinai (1937). *Plantations:* Arboretum, Fruticetum, Herbaceous Garden. *Seed List.*

TAIHOKU

Botanic Gardens of Taihoku Imperial University

Taihoku, Taiwan

Director: S. Hibino (1937). Seed List.

TOKYO (1)

Botanic Gardens of Tokyo Imperial University

Koishikawa-Ku

Established: 1684. *Area:* About 45 acres.
Director: T. Nakai (1935–?).

Open free daily. Source of income: Annual appropriation from National Government. *Library:* The University Library. *Herbarium:* Engler and Gilg system. *Publications:* Seed Exchange List. Guide. *Plantations:* Systematic (Engler and Gilg). Specializes in Asiatic plants.

TOKYO (2)

"Botanical Gardens of the Imperial Household"

(Imperial Palace Botanic Garden)

Shinjuku Yatsuya-Ku

In the *Proceedings* of the Linnean Society of London (Session 1931–32, Part IV, p. 147), it is stated that His Imperial Majesty, the Emperor of Japan, maintains a private botanic garden and laboratory.

In a letter of January, 1934, a correspondent of the author, Mr. Bunkio Matsuki, reports that he made a careful investigation "in regard to a botanic garden in the Imperial Household," with the aid of the Imperial Household Librarian, Hon. S. Kitsui, and found as follows:

"His Majesty, the Emperor of Japan, is an earnest student of biology and possesses a laboratory in Momijiyama, which is a part of the private Imperial Palace Garden. As far as the investigation was made there is no botanic garden in the compound of the Imperial Palace. But, in one sense, the whole Momijiyama (which means 'Maple-Mount') is devoted to all kinds of flowers, and itself is a botanic garden."

TOKYO (3)

Tsumura Medicinal Plants Garden

Tsumura Laboratory, Senkawa, Jindaimura, Tokyo

Director: Dr. Jukyu Cho. *Note:* Questionnaire not returned. The claim was made (in 1934) that this was the only medicinal plant garden in Japan. *Publication:* Bulletin (No. 1, January, 1931).

Irish Free State

CORK

Botanic Garden of University College

University College, Cork

Established: 1877. *Area:* about 2 acres.

Plantations: Systematic garden (about 1½ acres), rockeries, water and bog gardens. *Herbarium:* Native and foreign (especially American). *Head Gardener:* J. Griffin (1914).

DUBLIN

Trinity College Botanic Gardens

Shelbourne Road, Ball's Bridge

Established: 1806. *Area:* 8 acres.
Directors:

1. J. T. Mackay (1806–1855)
2. John Bain (1855–1868; 1873–1874)
3. A. Dickson (1868–?)
4. E. P. Wright (?–1873)
5. Michael Dowd (1874–1876)
6. —— McKenzie (1876)
7. F. W. Moore (1876–1879)
8. F. W. Burbridge (1879–1905)
9. Henry H. Dixon (1905–)

Source of income: Trinity College, Dublin. *Library:* That of Trinity College. Herbarium. *Plantations:* Systematic; Arboretum. Seed List. *Study material:* Living specimens of both wild and cultivated plants are supplied to schools occasionally when requested.

GLASNEVIN, DUBLIN

The Botanic Gardens

(Garraí Na Lus)

Glasnevin, Dublin, N.W. 3, Ireland

Established: 1794. *Area:* 51 acres.
Directors: (*Curator,* 1794–1877; *Keeper,* 1877–)

1. —— Wade (1794–1825)
2. Samuel Litton (1826–1834)
3. Ninian Nivin (1834–1838)
4. David Moore (1838–1879)
5. Sir F. W. Moore (1879–1922)
6. J. W. Bessant (1922–)

Serves as a public park. Open free, daily, from 10 a.m. to 7 p.m. or dusk; Sundays from 11 a.m. *Source of income:* Annual vote of Parliament. *Library:* About 5000 volumes and pamphlets. *Herbarium:* Approximately 15,000 specimens, including the "Augustine Henry" Forestry Herbarium. The main National Herbarium is under the Department of Education and is included in the Natural History Department of the National Museum. There is an Arboretum and a Fruticetum. *Plantations:* Systematic, Rock Garden, Rose Garden, Herb Garden. *Publications:* Seed List (Liosta Siolta le Malartú); The Botanic Gardens: Origin, History, and Development (Reprint from the Dept. of Agr. Journal

33: No. 2, 1936). Does not supply living material for study to local schools, but only to Colleges and Higher Grade Schools (National University, Royal College of Surgeons, and others).

Java

LAWANG

JARDIN BOTANIQUE

Director: M. Buijsman (1934?).

Jugoslavia

BELGRADE (BEOGRAD)

BOTANICAL INSTITUTE, GARDEN, AND HERBARIUM OF THE UNIVERSITY

Jevremorac, Botanička bašsta

Director: Ljwb. M. Glišić (1935). Delectus Seminum.

LAIBACH (LJUBLJANA)

BOTANICAL INSTITUTE AND GARDEN OF THE UNIVERSITY

ZAGREB (FORMERLY AGRAM)

BOTANIČKI URT I ZAVOD UNIVERZITETA

(BOTANIC GARDEN AND INSTITUTE OF THE UNIVERSITY)

Zagreb, Marulic trg 20

Established: 1890. *Area:* 8 hectares.
Director: Vale Vouk (1890–).

Serves as a public park. Open free to the public daily, except Sundays. *Source of income:* Governmental subvention. *Library:* About 4000 volumes. *Herbarium:* About 120,000 specimens. *Plantations:* Systematic, geographic, economic, ecologic. Arboretum and Fruticetum. *Publications:* Acta Botanica of the Botanical Institute. Delectus Seminum.

Latvia

RIGA

BOTANIC GARDEN OF THE UNIVERSITY OF LATVIA

(LATVIJAS ŪNIVERSÍTĀTES BOTANISKAIS DĀRZS)

Alberta ielā 10

Director: N. Malta.
Publications: Acta Horti Botanici Univ. Latviensis (May, 1936). List of Seeds (Sēlker Saraksts).

Lithuania

KAUNAS (1)

VYTAUTO DIDŽIOJO UNIVERSITETO BOTANIKOS SODAS

V. D. Un-to Botanikos Sodui

Established: 1923. *Area:* 30 hectares.
Director: Constantin Regel.

Serves as a public park. Admission, free, 9 a.m. to 6 p.m. *Source of income:* In 1934—48,000 lt. from the University and the salary of the staff. Governmental appropriations and the University. *Library:* About 6000 volumes at the Botanic Institute of the University. *Herbarium:* About 50,000 specimens. *Arboretum:* About 600 species. *Fruticetum:* About 100 varieties. *Plantations:* Systematic, geographic, economic, morphologic, ecologic, rosarium, etc. *Publications:* Index seminum (annually). Scripta horti Botanici Universitatis Vytauti Magni. *A small museum* with about 3000 specimens. *Affiliation:* With the University at Kaunas, which has also three sections of applied botany: a. medicinal plants; b. plant diseases; c. nursery for trees and shrubs.

KAUNAS (2)

MEDICAL PLANT SECTION OF THE BOTANIC GARDENS OF THE UNIVERSITY

V. D. Un-to Botanikos Sodui Vaistiniu Augalu Skyrius

Director: Provisor K. Grybauskas (1936).
Publications: Lithuanian Medicinal Plants, Vols. I & II, by K. Grybauskas. Seed List.

Luxembourg

LUXEMBOURG

The old botanic garden of the Grand Duchy of Luxembourg has been abandoned, and the grounds transformed into a public park. The herbarium of the former garden was transferred to the Musée National. There is still (1937) the Botanische Abteilung des Grossherzoglichen Instituts.

Madagascar

TANANARIVE

PARC BOTANIQUE ET ZOOLOGIQUE DE TANANARIVE

Established: 1927. *Area:* 23 ha.
Directors (*Head Gardener*): Francois (1927–1934); P. Boiteau (1934–).

Serves as a public park. Open free, daily, except Sunday. *Source of income:* Government appropriations. *Herbarium:* 4000 specimens (local flora). *Plantations:* Ecological (Ombrarium, Rocailles, Humides, etc.). *Publication:* Index Seminum et Sporarum (Index l'Échanges). *Museum:* Being reorganized. *Lectures* are given to school children and study material is loaned and given to schools. *Greenhouses* include an "aseptic" house for growing Rhizoctonia symbionts of indigenous orchids. *Note:* 830 species cultivated—230 Madagascar flora, 600 foreign, principally xerophytes from Mexico, U. S. A., So. Africa and Mauritius.

Malta

FLORIANA

ARGOTHI BOTANIC GARDEN OF THE UNIVERSITY OF MALTA

Director: S. L. Vella (1937). Seed List.

Manchoukuo

HARBIN (CHARBIN)

BOTANIC GARDENS OF THE MANCHURIAN RESEARCH SOCIETY

Director: I. Fukushima (1937).

PORT ARTHUR (Ryojun)

Botanic Gardens

Director: J. Sato (1937).

Mauritius

PAMPLEMOUSSES

Botanic Garden of Pamplemousses

Director of Agriculture, Reduit, Mauritius

Established: 1735. *Area:* About 130 acres (90 arpents).

Successively known as Jardin "Mon Plaisir," Jardin des Plantes, and Jardin Royal.

Directors:

1. Le Poivre (1767–October, 1772)
2. Jean Nicolas de Céré (1774–May 2, 1810)
3. Auguste Céré (1810–December 3, 1810)

   The Island surrendered to the British, December 3, 1810.
4. John White (1820–1826)
5. Mr. Burke, Honorary Supervisor.
6. Charles Telfair, Honorary Supervisor (1826–1829)
7. J. Newman (1829–1849)
8. James Duncan (May 1849–1864)
9. Charles James Meller (1864–1866)
10. John Horne (ad interim, 1866–August, 1876)
11. John Horne (1876–August, 1893)
12. William Scott (1893–July, 1898)
13. Joseph Vankiersbilck (1898–September, 1903)
14. Paul Koenig (1903–1913)
15. Frank Arthur Stockdale (1913–1916)
16. Gilbert Grahame Auchinleck (1916–1917; acting)
17. Harold Augustin Tempany (1917–1929)
18. Donald d'Emmerez de Charmoy (1929–1930)
19. Alexander George Glendon Hill (1930–1932; acting)
20. Gilbert Edwin Bodkin (1932–)

Note: On the creation of the Agricultural Department the Pampelmousses Garden came under the administration of the Di-

rector of the Department, July, 1913, and the scientific work centered on the study and cultivation of sugar cane, and the scientific application of manures to increase its productivity. (Bull. Misc. Information. Kew. Nos. 6 and 7. 1919. Pp. 279–286.)

Mexico

CHAPULTEPEC

JARDÍN BOTÁNICO DE ACLIMATACIÓN

Chapultepec, Mexico, D. F.

Established: 1923. *Area:* 7 hectares.
Director: Prof. A. L. Herrera (1923–).

Serves as a public park. Open free, daily, 7 to 17 (7 a.m. to 5 p. m.). *Source of income:* Supported by the Federal Government and the Sociedad de Estudios Biológicós. *Library:* More than 2000 books and pamphlets. *Herbarium:* Approximately 60,000 specimens. *Plantations:* arranged systematically. Arboretum and Fruticetum. *Publications:* Boletin de la Direccion de Estudios Biológicós. *Supplies living plants* for study to local schools.

MEXICO, D. F.

JARDIN BOTÁNICO

SAN JUAN BAUTISTA (OR BAPTISTA)

(Formerly Villa Hermosa)

JARDIN BOTANICO "PLUTARCO ELIAS CALLES"

San Juan Bautista, Tabasco

Established: September 1925. *Area:* "1 Ha. 52 A. 62' 9C."
Director: Joaquin Camelo G. (January 18, 1926–).

Serves as a public park. Open free daily. *Income:* Government appropriations. *Library:* The Director's library, containing about 1500 books. *Herbarium:* The Instituto "Juarez," containing about a thousand specimens. *Plantations:* Systematic, economic, ornamental; Arboretum and fruticetum. *Special lectures* given occasionally. *Living study material:* Supplied occasionally to schools. *Affiliated* with the Instituto "Juarez."

Netherlands

AMSTERDAM

HORTUS BOTANICUS

Plantage Middenlaan 2a

Established: 1682. *Area:* 4 acres.
Directors: First a Board of Administration. Since 1877, Directors.
1. C. A. J. A. Oudemans (1877–1896)
2. Hugo de Vries (1896–1918)
3. Ed. Verschaffelt (1918–1923)
4. Theo J. Stomps (1923–)

Open to the public daily. Admission, flo. 50 (20c or 25c) on Sundays and Wednesdays and Saturday afternoon. *Source of income:* Annual appropriations by the municipality. *Annual Budgets* (1934): fl. 4100 (without salaries, coal, water, gas, electricity), and fl. 1800 for the library. The laboratories also have their own appropriations, fl. 4000. *Library:* Reference only. *Herbarium:* Contains, first, control specimens for the plants of the garden, then, an almost complete collection of Holland and several local collections of the Dutch East Indies. *Plantations:* Systematic, experimental. *Publication:* Seed List. *Museum:* Has a large collection of fungi. *Instruction:* Regular courses are given at the garden by three members of the staff (only for students). *Affiliations:* The garden is a university institution with 2 laboratories. a. botany in general; b. plant physiology.

BAARN

CANTONSPARK, BOTANIC GARDEN OF THE STATE UNIVERSITY OF UTRECHT

Cantonspark, Javalaan 5

Established: November 16, 1920. *Area:* 4 Ha.
Director: A. Pulle (1920–).

Serves as a public park two days a week. Admission free, Monday and Wednesday 9–12 and 2–5. *Source of income:* Budget of the State Department of Education. (Arts and Sciences.) It is the Property of the State. *Library:* That of the Botanical Museum and Herbarium of the University of Utrecht. *Herbarium:* That of the Botanical Museum and Herbarium of the University Utrecht. *Plantations:* Systematic and mixed, Arboretum and a

Fruticetum. There is a phytopathological section. *Publication:* Seed List (Zaadlijst). *Affiliation:* The Garden at Baarn is a second botanic garden of the Rijksuniversiteit, Utrecht; the other smaller garden is in Utrecht.

DELFT

Cultuurtuin Voor Technische Gewassen

Poortlandlaan 67

Established: March 5, 1917. *Area:* 2.5 ha.
Director: G. van Iterson, Jr. (1917–).

Source of income: Grants from the Government Treasury. *Library:* 3600 volumes, 3000 pamphlets. *Herbarium:* 15,000 specimens. *Plantations:* Partly systematic, partly economic. *Publication:* Liste des Graines. *Museum:* For technical and economic plants in the laboratory. Free for students. *Supplies living material* for study in local schools. *Affiliation:* Laboratory for Technical Botany of the Technische Hoogeschool, Delft. (Laboratorium voor Technische Botanie en Cultuurtuin van de Technische Hoogeschool.)

GRONINGEN

Hortus Botanicus Groninganus

Groote Rozenstratte 31

Established: 1642. *Area:* 1.5 hectares.
Directors: J. W. Male (1890–?); W. H. Arisz (1936).

Open to the public on payment of admission fee of 15 cents, except Tuesdays from 2–4, when the admission is free. *Source of income:* Appropriations by the State. *Library and Herbarium* are in the botanical laboratory. *Species under glass:* 3000. *Herbaceous plants out of doors:* 2600. *Museum:* In the botanical laboratory. *Study material:* Flowers, leaves, buds, wild plants, cultivated phanerogamic plants, and cryptogams are supplied occasionally, when requested, to both public and private schools. *Affiliation:* Belongs to the University of Groningen. *Publication:* Index Seminum.

HARTECAMP

George Clifford (1685–1760), a director of the Dutch East India Company, "formed a famous botanic garden with museum and library at Hartecamp."

Linnaeus visited this garden in 1735. The herbarium was arranged and written up by Linnaeus under the title, *Hortus Clif-*

fortianus. 3000 species of this collection (thirteen sheets of which bear notes in handwriting of Linnaeus) forming the types of this work are now in the Herbarium of the British Museum. (*Fide*. British Mus. (Nat. Hist.) Dept. Bot., Exhibition of a selection from the historical collections. Fifth International Bot. Congress, 1930. London, p. 13.)

LEIDEN

Hortus Botanicus

Nonnensteeg 3

Established: 1587. *Area:* 2 hectares.

Directors:

1. G. Bont (1587–1593)
2. Ch. Clusius (1593–1609)
3. P. Baaw (1609–1617)
4. E. Vorstius (Van Voorst) (1617–1624)
5. A. Vorstius (Van Voorst) (1624–1663)
6. A. Schuyl (1663–1670)
7. A. Syen (1670–1678)
8. P. Herman (1679–1695)
9. P. Hotton (1695–1709)
10. H. Boerhaave (1709–1731)
11. A. Van Royen (1731–1754)
12. D. Van Royen (1754–1786)
13. S. J. Brugmans (1786–1819)
14. C. S. C. Reinwardt (1819–1845)
15. W. H. de Vriese (1845–1862)
16. F. W. R. Suringar (1862–1893)
17. J. H. Janse (1899–?)
18. L. G. M. Baas Becking (1937)

Open free, daily, April 1 to October 1, from 9–6; October 1 to March 31, from 9–4. Sundays in summer, 10–4. October 1 to March 31, not open on Sundays. *Sources of income:* Endowment; annual appropriations by national government. *Library:* In the botanical laboratory. *Plantations:* Systematic (following Eichler), ecologic, pharmaceutic. *Arboretum* (about 100 species). *Fruticetum* (about 400 species). *Species under glass:* about 1500. *Herbaceous plants out of doors:* About 1400 species. *Publication:* Seed List. *Supplies living material* (except wild flowers) occasion-

ally, when requested, to both public and private schools. *Affiliation:* The State University, Leiden. *Note:* Alphonse Lavallée states that "the first greenhouse" was established at Leiden in 1599, "for the protection of some plants introduced from the Cape of Good Hope, Geraniums, Mesembryanthemums, etc. It contained, according to Boerhave, nearly 6000 plants."

Sir William Brereton (Travels in Holland, London, 1844) states that this Garden is one of only two things "memorable" about the University of Leiden. He describes how Adolphe Van Voorst gave his lectures in this Garden "very fluently" in Latin. "His manner is to take a whole bed, four yards long and one broad, and to discourse of the nature and quality of every herb and plant growing therein, which he points out with his staff when he begins to speak thereof."

ROTTERDAM

Botanical Section of the Zoological Garden

Seed List.

UTRECHT

Hortus Botanicus

L. Nieuwstratt 106

Established: End of the 17th or beginning of the 18th century.

Area: 1 ha.

Directors:

1. Bergsma (till 1861)
2. Miquel (1861–1871)
3. Rauwenhoff (1871–1896)
4. F. A. F. C. Went (1896–1934)
5. V. J. Koningsberger (1934–)

Open free to the public daily from 9–4 or 5 o'clock. *Source of income:* Annual appropriations by the national government. Appropriation, 1933 (not including salaries) 9800 guilders, out of which must be paid also the expenses of research, heating, etc. *Library:* About 8500 volumes (periodical volumes included), and about 3000 pamphlets. The Library of the Herbarium is combined with that of the Laboratory and garden. *Herbarium:* The *Herbarium,* established by Miquel (1861–1871), has about 200,000 specimens. It forms a distinct department together with the Botanical Museum under the directorship of the Professor of Systematic Botany. There is a conservator for the herbarium. The herbarium receives an independent appropriation from the gov-

ernment. *Publications:* Mededeelingen van het Botanisch Museum en Herbarium, Utrecht, Holland. Seed List. *Plantations:* Systematic, with a small rockery. Specimens under glass: 3500. Herbaceous plants out-of-doors: 1000 species. *Affiliations:* The Garden, together with the Botanical Laboratory, is a department of the University of Utrecht. All instruction is given by the botanical staff of the University. There is a director for both the laboratory and the garden, and a curator for the Garden. (See also Baarn.) *Affiliation:* Rijksuniversiteit, Utrecht.

WAGENINGEN

Arboretum of the State Agricultural College

To avoid all errors address only—Arboretum, Wageningen, Holland.

Director: J. Jeswiet (1936).

Publications: Mededeelingen van het Arboretum van de Landbowhoogeschool te Wageningen. (Begun in 1936.) Catalogue de Graines.

Netherland East Indies

TJIBODAS (NEAR SINDANGLAIJA)

Mountain Gardens and Biological Laboratory of the Government Botanic Gardens

New Guinea (Territory of)

RABAUL

Botanic Gardens of the Department of Agriculture

New Zealand

CHRISTCHURCH

Christchurch Botanic Gardens

Established: 1861. *Area:* 52 acres.

Directors:

1. T. Barker (1864–1867)
2. J. F. Armstrong (1867–1889)
3. A. Taylor (1889–1907)
4. J. Dawes (1907–1908)

5. J. Young (1908–1933)
6. J. A. McPherson (1933–)

Serves partly as a public park. Open from sunrise to sunset. *Source of income:* By rating areas (10 miles radius from Chief Post Office). *Library:* Approximately 100 volumes and 250 pamphlets. (Proposals are on foot to build proper library accommodation). *Supplies living material* for study to local schools. *Note:* The Garden is a recognized training ground for Horticultural Students wishing to sit for the National Diploma of Horticulture (N. Z.). Classes are held among the living specimens, and the period of training is limited to five years. (Both boys and girls are taken on as trainees.)

DUNEDIN

Dunedin Botanical Gardens

In 1878 this Garden was brought under the Public Domains Act of 1860 and placed under the control of a board of seven members. In 1884 this plan was terminated and the control vested in the Dunedin City Council. *Plantations:* Special section for indigenous plants.

WELLINGTON (1)

Botanic Garden

Established: 1870 (*Nature,* Nov. 6, 1919, p. 263).

WELLINGTON (2)

Otari Open-Air Native Plant Museum

Established about 1930–31 by Dr. L. Cockayne and Mr. J. G. Mackenzie. Native plants are grouped on an ecological basis.

Nigeria

IBADAN

(Botanic Gardens Discontinued)

Director of Agriculture, Ibadan, Southern Nigeria

The following statement was received on October 30, 1913, from the Director of Agriculture:

"In reply to your circular letter of 1st September 1912, I have the honor to inform you that the *two botanic gardens* (*Ebute*

Metta) *and* (*Calabar*), which previously existed in Southern Nigeria have been converted into Economic Gardens and are controlled from this office. Strictly speaking, no Botanic Gardens now exist in Southern Nigeria."

North Africa

ALGER

Jardin Botanique de l'Université d'Alger

Established: 1887. *Area:* About 3 hectares.
Directors: 1. Louis Trabot (1887–1923); 2. René Maire (1923–).

Open every day from 8 to 12 and from 2 to 5 for students and authorized travelers. Admission free. *Source of income:* Budget of the University. *Library:* About 10,000 volumes and pamphlets. *Herbarium:* About 300,000 specimens. *Arboretum:* Inaugurated in 1935. *Plantations:* Systematic. *Publication:* Index Seminum.

Norway

AAS

Botanic Garden of the College of Agriculture

Norge Landbrukshöiskole

BERGEN

Bergens Museums Botaniske Have

Established: 1897. *Area:* "Quite small."
Directors:

1. Jørgen Brunchorst (1897–1906)
2. Jens Holmboe (1906–1925)
3. Rolf Nordhagen (1925–)

Serves as a public park. Open daily from 7 a.m. to 11 p.m. *Source of income:* Annual appropriations from the state and from the city. *Publication:* "Forschungen aus dem Botanischen Garten in Bergen." *Notes:* "During the years 1926–1930 the present director succeeded in enlarging the grounds considerably. It is still the only botanic garden in Western Norway and contains about 2500 species of hardy plants cultivated in the open and systematically arranged in natural families, but also freely arranged in rock-grounds, pools, etc." "As the climate in Bergen is very mild, a lot of evergreen shrubs, conifers, and perennials can be grown in the open which otherwise do not thrive well in

Scandinavia. (Rhododendrons, Azaleas, Ligustrums, Skimmias, Araucaria araucana, Cryptomeria japonica, Bamboos, Solanum crispum, Olearia Haastii, Buddleias, Griselinia littoralis, Pernettyas, species of Erica and many perennial herbs and bulbs from warmer regions as *Roscoea cautleoides* and *purpurea,* Meconopsis Baileyi, Gentiana Farreri, Trilliums, Kniphofias, Cypripediums, Iris reticulata, Calochortus albus, Narcissus bulbocodium, etc.) The Garden has a modest conservatory for educational purposes Courses of lectures are given at the Museum for students of natural science and archeology.

OSLO

Universitetets Botaniske Have
Universitetets Botaniske Museum

Established: 1814. *Area:* (1933): 130,000 square meters. *Directors:*

1. Christen Smith (1814–1816)
2. Jens Rathke (1816–1843)
3. M. N. Blytt (1843–1862)
4. F. Chr. Schübeler (1864–1892)
5. J. N. F. Wille (1893–1924)
6. Jens Holmboe (1925–)

Serves as a public park. Open free, daily, in summer from 7 a.m.–10 p.m. *Source of income:* Government appropriation. *Annual Budget* (1933–1934): 29,600 Norwegian crowns (kroner), excluding fuel and salaries to director, gardeners, and assistant. *Library:* About 8500 volumes. Periodicals currently received about 300. *Arboretum* and Fruticetum are combined. Number of trees and shrubs, about 1800 (about 500 species). *Plantations:* Systematic, Geographic, Economic. *Species under glass:* About 2500. *Herbaceous plants out of doors:* About 4000 species. *Publications:* Jointly by the Garden and the Museum: "Nyt Magazin for Naturvidenskaberne." Annual Seed List. *Museum:* Erected in 1913. *Lectures:* No public lectures are given at the Garden, but students from various schools and the University are given regular instruction and demonstrations. *Affiliations:* The Royal Frederic University, Oslo.

TROMSÖ

The Garden of Tromsö is not a botanical garden in the strict sense of the word. It is more particularly a park, wherein, be-

sides ornamental plants, stress is laid upon the planting of indigenous timber and bushes. The museum has a botanical section, including a herbarium, and specimens of the vegetation of northern Norway. There is no special director or custos for the botanical division.

Palestine

JERUSALEM

BOTANICAL GARDEN OF THE HEBREW UNIVERSITY MONTAGUE LAMPORT MEMORIAL

P. O. Box 340

Established: 1932. *Area:* 3¼ ha.

Directors: In charge, Dr. Alexander Eig, Dept. of Botany, Hebrew University.

Source of income: University budget (special Lamport fund). *Library:* 1250 volumes; about 1200 separata. *Herbarium:* 140,000 specimens. *Plantations:* Geographic, ecologic. *Museum:* University collections of Palestinian fruits, vegetables and woods. Museum of Biblical Botany and Plantlore. Free admission.

Paraguay

ASUNCION

JARDIN BOTÁNICO

Peru

LIMA

JARDIN BOTÁNICO DE LA FACULDAD DE CIENCIAS

Philippine Islands

MANILA

THE FIRST AND NOW EXTINCT BOTANIC GARDEN

Established: Before 1787(?).

Note: E. D. Merrill (Philippine Jour. Sci. **7**: 363–369. Dec. 1912) gives evidence that there was a botanic garden in existence in the city of Manila at the time of the arrival of the Malasping Expedition (left Cadiz, Spain, July 30, 1789; arrived in Manila

March 27, 1792). Antonio Penada was the naturalist of this expedition and died in June, 1792. James Britten (Biographical Notes XXX.—L. A. Deschamps and F. Noronha *Jour. Bot.* **41**: 282–285. 1903) states that the Spaniards erected a monument to their countryman, Dr. Noroña, "in the island of Luzon, near Manila, on ground belonging to the royal botanic garedn which . . . Dr. Noroña had done everything in his power to bring into order, and to stock with many valuable plants." Noroña died in 1787, and this is evidence that the botanic garden existed before the Malasping Expedition arrived. There is little doubt, says Merrill, that a monument to Pineda was erected in 1792 in what was at that time the Botanic Garden, in the same tract with the Noroña monument, "located outside the city of Manila, as the city was constituted from 1780 to 1800." As to when and why this garden was abandoned we have no record. The area was, after the American occupation, the site of the experiment station of the Philippine Bureau of Agriculture.

In 1858 a Botanical Garden was established in Manila within the zone of fortifications of the Walled City. Its area was but about 5 hectares. The first Director was Francisco Ramos, the second, Zoilo Espejo, the third Inocencio Madrigal, none of them of any eminence as botanists. In 1873 Domingo Vidal was given charge of the gardens in addition to his duties as Director of the Forestry Bureau. On his death in 1878, he was succeeded in both positions by Sebastian Vidal, who retained the position until his death in 1889.

The garden, as such, never amounted to very much due to the restricted area and unsuitable location. After Vidal's death no attempt was made to develop it, but it was maintained as an Institution until the American occupation in 1898. Since 1898 it has been maintained as a public park.

Poland

CRAKOW

BOTANICAL GARDENS OF THE JAGIELÓNSKI UNIVERSITY (OGRÓD BOTANICZNY UNIVERSYTETU JAGIELLÓNSKIEGO)

Kopernica 27

Director: Wladystow Szafer (1936).

KÓRNIK

The Kórnik Gardens and Arboretum
(Of National Foundation, Kórnik Institutes)
(Ogrody Kórnickie)

Gardens and Arboretum, Kórnik near Poznan

Established: 1926. *Area:* 52 hectares (130 acres).
Director: Anthony Wroblewski, since 1926.

Serves as a public park. Open daily from 8 a.m. to twilight. Admission, 10 cents. *Source of income:* Agricultural and forest property, area of 19,661 hectares. The Garden does not receive annual governmental appropriations. *Library:* 1270 volumes. *Herbarium:* 2000–4000 numbers. *Arboretum:* 25 hectares. *Fruticetum:* 5 hectares. Pomological Garden: 14 ha. Nurseries: 8 hectares. *Publication:* Catalog des Graines d'Arbres et d'Arbustes. *Museum:* Museum dendrologicum (not yet open).

The National Foundation of Kórnik Institutes has organized, on the strength of an Act of Parliament, an Institute for Research in Dendrology and Forestry. This Institute will carry on scientific research work on all sorts of forest, fruit, park, and other trees, with regard to their life, structure, anatomy, geographical distribution, acclimatization, cultivation, and uses of all sorts. The Institute consists of three sections, viz: Dendrology and Pomology, with the Gardens and Arboretum; Forest Biology; Forest Technology. At present the organized sections are Dendrology and Pomology, with the Gardens and Arboretum.

LEOPOL (LWÓW)

Botanical Garden of the Jean Kasimir University
(Ogród Botaniczny, Universytetu Jana Kazimierza)

Ul. Dlugosza 4 and Ul. Cetnarowska 54.

Director: St. Kulczynski (1937).
Herbarium: about 50,000 bundles. Seed List.

LWÓW (LEMBERG)

Ogród Flory Polskiej (Garden of Flora of Poland)

Ul. Cetnerowska 54, Ogród Botaniczny
Established: 1907. *Area:* 3.5 ha.

Directors:

1. Teofil Ciesielski (1907–1917)
2. Directorship vacant (1917–1924)
3. St. Kulczynski (1924–)

Open free to the public, 7 a.m. to 6 p.m. *Source of income:* University Jean Casimir, and government appropriations. *Library:* In Botanical Institute and Library of the University. *Herbarium:* About 60,000 specimens. *Plantations:* Ecologic. Arboretum and Fruticetum of Polish species only. *Publication:* Catalogus plantarum in horto cultivatarum (since 1933). *Museum:* Under organization. *Lectures* are given to school children at the garden. *Study collections* and living material are occasionally supplied to schools. *Affiliation:* With the Institute of Plant Morphology and Systematic Botany of the University.

POZNAN (1)

Hortus Botanicus Posnaniensis

(Ogród Botaniczny Poznanin)

W. Poznanin

Director: A. Wodziczko (1936). Selectus Seminum (Wykaz Nasion).

POZNAN (2)

Jardin Botanique de l'Universitè

Matejiki 5, Poznan

Seed List.

VILNO (1)

Botanical Garden of the University

Zakret, al Zakretowa 1

Director: J. Trzebinsky.

VILNO (WILNIE) (2)

Hortus Medicinalis Universitatis Batoreanae in Vilno

Institut de Parmacognosie, Universitè, Objasdowa 2, Vilno, Pologne

Director: Jan Muszyński (1936). Delectus Seminum.

WARSAW (WARSZAWA)

HORTUS BOTANICUS UNIVERSITATIS J. PILSUDSKII VARSOVIAE
(OGROD BOTANICZNY UNIWERSYTETU WARSAWSKIEGO)
Al. Ujazdowskie 6/8

Director: B. Hryniewiecki (1937). Index Seminum.

Portugal

COIMBRA

JARDIM BOTANICO DA UNIVERSIDADE
(INSTITUTO BOTÂNICO DO DR. JÚLIO HENRIQUES)
Instituto Botânico, Faculdade de Ciências

Established: 1772. *Area:* 13 acres.
Directors:

1. Domingos Vandelli
2. Félix de Avellar Brotero
3. António José das Neves e Mello
4. José de Sa Ferreira Santos do Valle
5. Antonio Rodrigues Vidal
6. Henrique do Couto Almeida Valle
7. Júlio Augusto Henriques
8. Luis Wittnich Carrisso (1936)

Serves as a public park. Open free, daily, 10 a.m. until sunset. *Source of income:* Budget of the State. *Library:* 22,000 volumes and pamphlets. *Herbarium:* 150,000 specimens. *Plantations:* Systematic and ecologic. Arboretum and Fruticetum. *Publications:* Boletim da Sociedade Broteriana; Memorias da Sociedade Broteriana; Anuario da Sociedade Broteriana; Index Seminum. *Museum:* Open free two hours daily. *Study collections* are loaned to the school children and also living material. *Affiliation:* Universidade de Coimbra.

LISBON (1)

JARDIM BOTANICO DA UNIVERSIDADE DE LISBOA
Faculdade de Sciencias, Lisboa

Director: Ruy Telles Palhinha (1936). Delectus Sporarum et Seminum.

LISBON (2)

Jardim Colonial de Lisboa

Roumania

BUCURESTI (1)

Grădina Botanică

Gădina Botanică, Universitea din Bucuresti

Director: M. Vladescu (?–1936); S. Radian (1937–).

Plantations: Systematic; Rock Garden. Herbarium; Museum; Library.

BUCURESTI (2)

Botanic Garden of the Agricultural Academy

Academia de Inalti Studii Agronomice, Bucresti-Herastrău

Has an experimental garden for medicinal plants.

CLUJ (1)

Botanic Garden of the University

(Grădina Botanică, Universitatea "Regele Ferdinand I")

Str. Regala 28

Established: 1873 (Old Garden). A *new Garden* was organized in 1919.

Area: The old and now abandoned Garden has 8 hectares. The new Garden is 18 cad. jug. (env. 10 Ha.).

Directors:

1. A. Kanitz (1873–1897)
2. J. Istvánffy (1897–1901)
3. A. Richter (1901–1913)
4. V. Borbás (1904–1905)
5. St. Györffy (1913–1919)
6. Al. Borza (1919–)

Serves as a public park. Open daily from 7 a.m. until dark. *Source of income:* State Budget and private incomes for material expenses of research work, publications, material service of the Garden and Museum. *Library:* Library of the Botanical Institute (7500 volumes). *Herbarium:* Herbarium of the Botanical Museum (mounted and unmounted), approximately 630,000 specimens. *Arboretum* and fruticetum are not separate. *Plantations:* 1. Systematic. 2. Flora of Roumania (geographical, ecological). 3. Extra-Roumanian floras and Rock Garden. 4. Morphologic-

biologic groups. 5. Pomological section. 6. Economic section. 7. Officinal plant section. 8. Conservatories. 9. Japanese Garden. 10. Historical garden of Pliny. 11. Ornamental plants. The Garden has also 5 scientific natural reservations in its property Fânate, Suat, Zau, Băile Episcopiei, Tulghes. In 1934 it came into possession of the Botanical Station of the Botanical Garden of Cluj in the Bihor Mountains, in the climatic locality Stana de Vale. *Publications:* 1. *Buletinul Grădinii botanice si al Muzeului bot. dela Universitatea din Cluj* (in Roumanian and international languages). Vol. I–XVI. 2. Flora Romaniae exsiccata, projected in 60 parts, XI centuries have already (1934) been published. 3. Popular Leaflets of the Botanical Garden, Cluj. 2 numbers. 4. Contributions Botaniques de Cluj, Roumanie. Separate reprints. *Museum:* There is a great Botanic Museum of the University, open daily. *Study collections* to loan to schools; supplies living matter for study to all local schools.

CLUJ (2)

Grădina Botanică de Academia de Inalte Studia Agronomice din Cluj

Established: About 1900. *Area:* 0.5 hectare.
Directors: Pater Béla (1900(?)–1920); Prodan (1920–).

Open daily, for students only. *Source of income:* The Agricultural College. *Plantations:* Systematic and economic.

South Africa

CAPE TOWN

Cape Town Botanic Garden

Commissioners appointed May 5, 1848, opened a subscription list, appointed as gardener a local nurseryman of the name of Draper, and laid out and planted an area assigned for their use from the Government Gardens. Governmental appropriations were meager (7£ 10s. per month!), and Karl Zeyher, celebrated botanical collector, appointed 1849, was dismissed the following year. Dr. Berthold Seeman, who visited the Garden in 1851, wrote that the Committee had "passed a resolution that their Botanic Garden could do without a botanist." Toward the end of 1891, while the Garden was under Professor MacOwan, F.L.S., as Director (1880–1891), Government appropriations being wholly inadequate, the Commissioners voted to discontinue the

garden as a botanical establishment and treat it as "merely a town *pleasaunce* of flowers and shady walks." The change became effective Jan. 1, 1892. The *Kew Bulletin* (Jan. 1892) expressed the hope that at some future time a Botanic Garden might be established at the Cape under scientific control. *See Kirstenbosch.*

DURBAN (1)

Municipal Botanic Garden
Durban, Natal

Established: 1849. *Area:* 48 acres. ⅓ undeveloped until recently. Part of this area laid out in 1934.

Directors: (official title Curators).

1. —— Johnstone (1849–1850)
2. M. J. McKen (1851–1853; 1860–1872)
3. Alex. Smith (1853–1854)
4. —— Plant (1854–1856)
5. James Weir (1856–1857)
6. R. Rogers (1857–1859)
7. —— DeLa Chaumette (1859 3 mos.)
8. A. Moore (1859–1860)
9. —— Keit (1872–1881)
10. J. Medley Wood (1882–1900) as Curator. In 1900 became Director of Natal Herbarium and the Municipal Botanic Garden, which were then combined. In 1913 became Director of the Natal Herbarium. (See Durban 2.)
11. J. Wylie (1913–1930)
12. H. Rutter (1917–1930)
13. Botanic Gardens came under the direction of the Director of Parks and Gardens (Director, Mr. P. Robertshaw, 1930–1932).
14. F. W. Thorns (Officer in charge of Botanic Gardens, 1932–?)
15. P. Robertshaw (1936)

Serves as a public park. Open free to the public daily from 7:30 a.m. to 6 p.m. Children under ten years of age are not admitted unless "accompanied by a competent protector." *Source of income:* Maintained by the Corporation of Durban as a section of the Parks and Gardens Department. Direct income—nil. *Herbarium:* (See Natal Herbarium and Plant Pathological Sta-

tion.) *Scientific publications:* Natal Plants, Vol. 1 by Wood and Evans; Vols. 2–5 by J. Medley Wood. Each vol. of 100 plates and descriptions. *Study material* is furnished occasionally to public schools when requested. Formerly combined with the Natal Herbarium, but taken over in 1913 by the Municipality. (See Durban 2.)

DURBAN (2)

The Natal Herbarium and Plant Pathological Station

Durban, Natal

Established: 1913. Taken over by the Government of the Union of South Africa in 1913 and given its present name. It is an out station of the Division of Plant Industry, Department of Agriculture. *Was formerly combined with the Natal Botanic Garden* (which see).

Directors: J. Medley Wood (1913–1915); P. A. van der Bijl, Mycologist-in-charge (1915–1921); H. H. Storey, Mycologist-in-charge (1922–1928); A. P. D. McClean, Mycologist-in-charge (1928–).

A collection of many type specimens of species brought together by Dr. J. Medley Wood is housed here, and is open to the public. The determination of plants is undertaken for inquirers.

Source of income: Appropriations by the Union of S. Africa Government. *Herbarium:* A quarantine greenhouse of modern type has been built by the South African Sugar Association at the Herbarium, and in this building new varieties of sugar cane, imported from foreign countries, are grown under conditions of strict isolation and inspection by Government officers. The pathological laboratory undertakes the examination of diseases of any crops, but its activities have, in recent years, mainly centered round the group of virus diseases of plants. Investigations of Streak disease of sugar cane and maize, of mosaic of the same host plants and of rosette disease of peanuts have shown them to be transmitted under local conditions by particular insects. This institution has a special experimental ground adjacent to the building and is equipped with insect-proof greenhouses for the study of plant virus diseases.

GRAHAMSTOWN (C. P.)

Municipal Botanic Garden

Curator: E. Lever (1937).

KIRSTENBOSCH

National Botanic Gardens of South Africa

(Headquarters) Kirstenbosch, Newlands, C. P.

Includes two gardens, viz: (1) Kirstenbosch; (2) The Karoo Garden, Whitehill, C. P. (near Matjesfontein). See under Whitehill.

Established: 1913. Karoo Garden established 1921 by private benefaction. *Area:* (1) Kirstenbosch (including Upper Kirstenbosch Nature Reserve) approximately 1100 acres. (2) Whitehill, 40 acres.

Directors:

H. H. W. Pearson (1913–Nov., 1916)
2. Directorship vacant (1917–1918)
3. R. H. Compton (March, 1919–).

Kirstenbosch is open free to the public during daylight every day of the year. Whitehill is open on weekdays during working hours.

Source of income: The funds of Kirstenbosch are derived from: (1) grants made by the Union Government, the Cape Town Corporation, and the Cape Divisional Council; (2) private benefactions, either direct or through the Botanical Society; (3) sales and miscellaneous. The funds of Whitehill are derived from private subscriptions and from sales only.

Library: The Bolus Herbarium includes a botanical library, mainly on South African systematic botany. The Gardens possess also a small reference library.

Herbarium: The Gardens do not maintain their own Herbarium, but the Bolus Herbarium, which is the property by bequest of the University of Cape Town, is located on a site in the Kirstenbosch grounds.

Species under cultivation: Exact number not available, but some thousands, almost entirely South African indigenous plants, with some hundreds of exotic plants of economic importance.

Affiliation: The Botanical Society of South Africa, of some 300 subscribing members was established in 1913 "primarily to give general and financial support to the work of Kirstenbosch and Whitehill." Members of the Society enjoy special privileges at the Garden. As stated in its Constitution, it is also the purpose of the Society "To encourage the inhabitants of South Africa to take an active part in the progress and development of the National Botanic Gardens at Kirstenbosch, the

Karoo Garden at Whitehill, and any other Garden that may be established by the Trustees of the said National Botanic Gardens; and to induce the said inhabitants to appreciate their responsibilities therein." Also, "To augment the Government grants toward developing, improving, and maintaining fully equipped botanical gardens, laboratories, experimental gardens, etc., at Kirstenbosch and to make grants to the Trustees in aid of any Garden referred to in the preceding subsection." *See Cape Town and Whitehill.*

STELLENBOSCH (C. P.)

Botanic Gardens of the University

Head: G. C. Nel (1937).

WHITEHILL

Karoo Garden

Karoo Garden, Whitehill (near Matjesfontein), Cape

Established: 1921. The Survey of the piece of ground chosen as the Logan Memorial Garden was carried out and the transfer to the Trustees was arranged in 1921. The land was offered by Mr. J. D. Logan, who died before the transfer of title was made.

Area: 20 morgen (= about 40 acres). About ⅓ Natural Reserve, and protected from grazing and planting.

Director: Karoo Garden is under the same control as Kirstenbosch, and also works in cooperation with the Bolus Herbarium for purposes of systematic research. Director, 1937, R. H. Compton.

Plantations: Cultivated area divided into sections on a geographical basis, e.g., Little Karoo, Southwest Africa, Hex River district, etc. Succulent flora chiefly dealt with, and planted according to districts. *See Kirstenbosch.*

Spain

BARCELONA

Jardí Botànic de Barcelona

Director: Font Quer (1936).

BLANES

Jardí Botànic "Mar i Murtra"

Director: C. Faust.

MADRID

Jardin Botànico de Madrid

Plaza de Murillo 2

VALENCIA

Jardin Botánico de la Universidad

Established: 1802. *Area:* 4 hectares.

Directors:

1. Vincente Soriano (1802–1804)
2. Vicente Alfonso Lorente (1804–1813)
3. Jose Pauli (1813–1817)
4. Joaquin Carrascosa (1829–1843)
5. Jose Pizcueta Donday (1843–1863)
6. Rafael Cisternas Fontsere (1863–1876)
7. Jose Arevalo Baca (1876–1890)
8. Vicente Gonzalez Caveles (1891–1892)
9. Eduardo Bosch Casanoves (1893–?)
?. F. Beltrán (1936)

Open on all working days from sunrise to sunset. *Source of income:* Appropriations by the national government and by the University. *Library:* Small. *Herbarium:* About 10,000 specimens. *Plantations:* Systematic, geographic, economic, arboretum (about 300 species), fruticetum (about 190 species), local flora. *Publication:* Seed List. *Museum:* Open, free, on all working days, on presentation of permit from the director. Living material, including wild plants, is supplied to both public and private schools occasionally when requested.

MADRID

Jardin Botánico de Madrid

Established: 1755. *Area:* About 12 hectares.

Directors: D. A. Frederico Gredilla y Gauns (1934); A. Garcia Varela (1936).

Herbarium: About 70,000 specimens. *Publication:* Catalogus Seminum.

Straits Settlements

PENANG

Waterfall Gardens

(Administered by Botanic Garden, Singapore, q.v.)

SINGAPORE

The Botanic Gardens

Director: R. E. Holttum.

Source of Income: Supported by the Government of Straits Settlements.

Sweden

BERGIELUND

See Stockholm (Hortus Bergianus)

GÖTEBORG

Göteborgs botaniska trädgård

Established: 1919 (1916). *Area:* 11 hect. under cultivation, 37 hect. wild park.

Director: Carl Skottsberg (July 1, 1919–).

Serves as a public park. Open free, daily, 8 a.m. until dark. *Source of income:* Appropriations by the City of Göteborg. *Library:* Several thousand volumes and pamphlets. No exact figures available. *Herbarium:* 300,000–400,000 specimens. *Plantations:* Systematic, geographic, ecologic. Arboretum and Fruticetum. *Publications:* Acta Horti Gotoburgensis (Meddelanden fran Göteborgs botaniska trägård). Delectus Seminum. *Museum:* Plan has been adopted to add a new wing to laboratory to serve as museum. Teachers bring classes of school children. Living matter supplied to local schools upon request. *Affiliation:* University of Göteborg.

HÄLSINGBORG

Botanical Garden

Established: 1936. *Area:* 12 acres.

In process of establishment. Specially for the Flora of Akania-Akåne.

LUND

Universitetets Botaniska Trädgård

Ö. Vallgatan 18

Directors:

1. Frederick Wilhelm Christian Areschoug (1879–1898)
2. Sven Berggren (1898–1902)
3. Svante Samuel Murbeck (1902–1924)
4. Inter-regnum (1924–1927)
5. Thore Christian Elias Fries (June 3, 1927–Dec. 31, 1930)
6. Inter-regnum (1930–1934)
7. Nils Heribert-Nilsson (March 1, 1934–)

Index Seminum.

STOCKHOLM

Hortus Bergianus (Bergiansk Botaniska Trädgården)

Stockholm 50

Established: 1791. *Area:* 17 acres.

Directors:

1. Olof Swartz (1791–1818)
2. J. E. Wikström (1818–1856)
3. Nils Johan Andersson (1856–1879)
4. Veit Brecher Wittrock (1879–1914)
5. Klas Robert Elias Fries (1915)

Library: More than 6000 volumes. *Plantations:* Systematic; Rock Garden. *Herbarium:* More than 10,000 species in over 20,000 sheets. *Affiliation:* Royal Academy of Science and School of Horticulture. *Note:* Located at Albano, northwest of Stockholm. Called Bergielund garden by its founder, Peter Jonas Bergius (pron. Bāre-Yūs), who died in 1790, aged 60. He had been a pupil of Linnaeus and had built up the library and herbarium. Wittrock established the *Acti Horti Bergiani,* published by the Garden.

UPPSALA (1)

Uppsala Universitetets Botaniska Trädgård

Botaniska Trädgården, Uppsala

Established: 1787. *Area:* 8.5 hectares.

Directors:

1. G. P. Thunberg (1787–1828)

2. G. Wahlenberg (1829–1851)
3. E. M. Fries (1851–1863)
4. J. E. Areschoug (1863–1876)
5. Th. M. Fries (1877–1899)
6. F. R. Kjellman (1899–1907)
7. H. O. Juel (1907–1928)
8. N. E. Svedelius (1928–)

Serves as a public park. Open free daily. *Source of income:* Annual appropriations by the National Government and own funds. *Plantations:* Systematic, economic, organographic, arboretum, fruticetum. *Publications:* Symbolae Botanicae Upsaliensis; Semina Selecta. *Note:* The former botanic garden of the University was founded in 1655 by O. Rudbeck, Sr. From 1742–1775, it was under the direction of Linnaeus. It is still maintained as a public historical garden ("Linné-Trädgården," Address: Svartbäcksgatan 27, Uppsala, Sweden) under the direction of the Swedish Linnean Society.

UPPSALA (2)

Hortus Linnaeanus
(Linné Trädgården)

Linnégatan 6

Established: 1923.

Keeper: Carl G. Alm (1936). Delectus Seminum.

Owned and under the direction of the Svenska Linnésällskapet, a Society founded in 1917 to publish writings by and about Linnaeus and his pupils, and to restore and maintain the old Botanic Garden of the University as it was in the time of Linnaeus.

VISBY

Botanic Garden of D. B. W.
(D. B. W.'s Botaniska Trädgården)

Switzerland

BASEL

Botanischer Garten

Botanische Anstalt der Universität, Schönbeinstrasse 6

Established: 1898. *Area:* 13,600 sq. m.

Directors: 1. G. Klebs (1898); 2. A. F. W. Schimper (1899–1901); 3. A. Fischer (1907–1912); 4. Gustav Senn (1912–?).

Serves as a public park. Open free daily. *Source of income:* From city and from the Freiwillige Academische Gesellschaft, Basel. *Library:* Both reference and circulating. *Publications:* Seed list, Annual. *Affiliation:* "The garden belongs to the botanical institute of the university."

BERN

Botanischer Garten der Universität

Altenbergrain 21

Established: 1859–60. *Area:* 2.6 hectares.

Directors: Ludwig Fischer (1860–1897); Edward Fischer (1897–?); W. H. Schopper (1936).

Serves as a public park. Open free daily. *Source of income:* Appropriations from both the State and the city of Bern. *Library and Herbarium.* *Plantations:* Chiefly systematic: Alpinum: Useful plants. *Publications:* Jahresbericht: Seed exchange list. *Living plant material* supplied in limited quantity to local schools for study. *Affiliation:* The Botanical Institute of the University of Bern.

BEX (VAUD)

"La Thomasia," Jardin Alpin

Established: 1891.

BOURG-SAINT-PIERRE

Jardin et Laboratoire Alpins de La Linnaea

La Linnaea, Bourg-Saint-Pierre, Valais

Established: 1889.

Directors:

1. H. Correvon (1889–1915)
2. Robert Chodat (1915–1934)
3. Fernand Chodat (1934–)

Open to the public daily. Admission 0.25 centimes. *Source of income:* Société de l'Université de Genève. *Library:* 500 volumes. *Herbarium:* "Temporaire." *Plantations:* Geographic, Ecologic, Arboretum, Fruticetum. *Affiliation:* Administered by the University of Geneva.

FRAUENFELD

Botanischer Garten der Thurgauischen Kantonsschule

Established: 1864. *Area:* 25 ar.
Directors (always the professor of botany in the Kantonsschule):

1. L. Wolffgang (1864–1872)
2. E. Kollbrunner (1872–1877)
3. G. Stricker (1877–1889)
4. H. Wegelin (1890–1920)
5. A. Günthart (1920–)

Source of income: Supported by the State of Thurgau as a part of the Kantonsschule. *Plantations:* Systematic, ecologic. *Instruction:* Lessons in botany in the Kantonsschule are given at the Garden.

GENEVA

Conservatoire et Jardin Botaniques de Genève

Rue de Lausanne 192, Geneva

Established: 1817. *Area:* 6–7 ha.
Directors:

1. Augustin-Pyrame de Candolle (1817–1849)
2. Alphonse de Candolle (1817–1849)
3. G. Reuter (1849–1872)
4. Jean Muller (arg.) (1874–1896)
5. John Briquet (1896–1931)
6. B. P. G. Hochreutiner (1931–)

Serves as a public park. Open free, daily, from 7 a.m. to 7 p.m. The Alpine Garden is open on Thursday and Sunday. *Source of income:* Supported by the City and gift of Rockefeller Foundation. *Library:* 30,000 volumes. 40,000 pamphlets. *Herbarium:* 3,000,000 specimens. *Plantations:* Systematic, Alpine Garden, Geographic, Pharmaceutical Garden. Arboretum and a Fruticetum. *Publications:* Candollea; Annual Reports; Seed List. *Museum:* Open free, daily, from 2 p.m. to 5 p.m. except Saturday and Sunday. *Special lectures* given to the schools and the University. *Supplies great quantities of living material* for study to the local schools. *Affiliation:* The actual Director is Professor of Systematic Botany at the University and Director of the botany collections there.

Note: The origin of the Jardin Botanique of Geneva dates from the beginning of the 19th century, and is intimately associated with the arrival at Geneva of Augustin-Pyrame de Candolle. He had been professor of botany at Montpellier, and made the establishment of a botanic garden, a condition of his accepting the professorship at Geneva.

INTERLAKEN

ALPENGARTEN "SCHYNIGE PLATTE"

LAUSANNE (1)

JARDIN BOTANIQUE DE L'UNIVERSITÉ

Director: E. Wilczek (1936). Graines Offertes en Echange.

LAUSANNE (2)

JARDIN ALPIN DU PONT DE NANT

ZÜRICH

BOTANISCHER GARTEN DER UNIVERSITÄT

Pelikanstrasse 30

Established: About 1832. *Area:* About 2 acres.
Directors:

1. Hans Schinz (July 18, 1893–April 15, 1929)
2. Albert Ulrich Däniker (ad interim, June 1, 1929–1933)
3. Albert Ulrich Däniker (1933–)

Herbarium, Library, Museum. Seed List (Verzeichnis im Tausch abgebbarer Sämereien und Fruchte).

Tanganyika

DAR-ES-SALAAM: BOTANIC GARDENS

Tasmania

HOBART

BOTANICAL GARDENS

Superintendent, Botanical Gardens

Established: 1844. *Area:* 25 acres.

Directors (Superintendents):

1. W. Newman (1848–1857)
2. Francis Abbott (1857–1903)
3. Alexander Morton (1903–1908)
4. Robert Hall (1908–1911)
5. John Wardman (1911–?)

The garden is part of the Queens Domain of 640 acres, which is under the care of the Superintendent of Gardens. Open free to the public on week days from 7 a.m.–6 p.m.; on Sundays from 2 p.m.–6 p.m.

Source of income: Endowment, and the sale of plants and seeds. *Herbarium:* Composed chiefly of Tasmanian and Australian species, with a few European. *Lectures:* Public lectures on nature study and botany. *Study material* (flowers, leaves, buds, pharerogamic and cryptomagic plants) is supplied to schools occasionally when requested, but local schools do not depend on the garden for all their material.

LAUNCESTON

Botanic Gardens

(Fide: Director of Agriculture, Adelaide, Australia)

Tchécoslovaquie (See Czechoslovakia)

Trinidad

PORT OF SPAIN

Royal Botanic Garden

Established: 1818. *Area:* 67 acres in garden proper. A large area is held in wild vegetation.

Superintendents:

1. D. Lockart (1818–1846)
2. T. Purdie (1846–1854)
3. H. Crueger (1854–1864)
4. H. Prestoe (1864–1886)
5. J. H. Hart (1887–1908)
6. J. B. Carruthers (1909–1910)
7. W. G. Freeman (1911–1922)
8. R. O. Williams (1922–1934)

Serves as a public park. Open free, daily, from sunrise to sunset. *Source of income:* Annual appropriation by the national government. Annual Budget, 1934: £1847. *Library:* Reference. About 1000 volumes. Current periodicals received: 23. *Her-*

barium: About 30,000 specimens. *Plantations:* No distinct divisions. *Species under glass:* Glass used very little, but Adiantums and other ferns are kept under partially glazed houses, with open sides. *Publications:* Flora of Trinidad and Tobago. Useful and ornamental plants of Trinidad and Tobago. Guide Book of the Royal Botanic Gardens.

Turkey

ISTANBUL

Hortus Botanicus Istanbulensis

(Istanbul Üniversitesi Nabatat Bahçesi)

Nabatat Bahçesi Direktörii, Fen Fakültesi, Üniversite, Istanbul

Established: 1936.

Director: A. Heilbronn (1937). Index Seminum (Tohum Kataloğu).

Uganda

ENTEBBE

Botanic Gardens

P. O. Box 60, Entebbe, Uganda, Africa

Established: 1898. *Area:* 70–75 acres.

Directors:

1. Mr. Alexander Whyte (1898–1902)
2. Mr. E. T. Dawe (1902–1903)
3. Mr. E. Brown (1903–1907)
4. Mr. R. Fyffe (1907–Apr. 1, 1917)
5. Mr. S. Simpson (1917–June, 1929)
6. Dr. J. D. Tothill (June, 1929–)

Serves as a public park, "but not in such a broad sense as the term is applied in England." Open free from sunrise to sunset, through the year. *Source of income:* Protectorate Revenue. Supported by Agricultural Dept. funds annually. *Library:* About 300 volumes, 50–100 pamphlets available at the Agricultural Laboratories, Kampala (Bot. Section). *Herbarium:* 4000 specimens approximately. No *arboretum,* but many fine tree specimens are among the collections. There is a small collection of fruit trees (tropical). *Supplies living material* for study to local schools.

Union of Socialist Soviet Republics

ALMA ATA (SEE KAZAKSTAN)

ASKANIA NORA

BOTANIC GARDEN

Askania Nora, U. S. S. R.

Affiliation: Die All-Ukrainische Akademie der Landwirtshaftlichen Wissenschaften, Staats-Steppen Institut. Seed List.

ASKHABAD

HORTUS BOTANICUS TURCOMANICUS

Askhabad (Turcomania), U. S. S. R.

Affiliation: Turkmenski Botanitscheskij Institut. Delectus Seminum.

BAKOU (BACU—A. S. S. R.) (1)

HORTUS BOTANICUS BAKUENSIS

Rue Communiste 10, Baku (Baki), U. S. S. R.

Director: A. A. Grossheim (1936). Delectus Seminum.
Affiliation: Sectio Botanica Filiae Azerbaidzhanicae Academiae Scienciarum, U. S. S. R.

BAKOU (A. S. S. R.) (2)

BOTANIC (EXPERIMENTAL) GARDEN (OPYTRIJ BOTANITSCHESKIJ SAD)

BATUM (ADSHARISTAN)

SUBTROPICAL BOTANICAL GARDEN

(BATUMSKIJ BOTANITSCHESKIJ SAD)

Makhinjauri, Georgia, U. S. S. R.

BILA ZERKVA (UCRAINE)

BOTANIC GARDEN (BOTANITSCHESKIJ SAD)

CHARKOW (UKRAINE)

BOTANIC GARDEN (CHARKOWSKIJ BOTANITSCHESKIJ SAD)

Klotschkowskaja 52

DNEPROPETROWSK (UCRAINE)

BOTANIC GARDEN (BOTANITSCHESKIJ SAD)

Rue Urizki No. 10

Director: A. Levitska (1936). Seed List.

ERIVAN (ARMENIA)

BOTANIC GARDEN (BOTANITSCHESKIJ SAD ARMENII)

Daschli—Kutscha 49, Armenia, U. S. S. R.

GORKY (VOLGA—FORMERLY NISJNY NOVGOROD)

BOTANIC GARDEN OF THE UNIVERSITY

Komsomolskij per 7, Gorky, U. S. S. R.

Director: S. S. Stankov (1937). Delectus Seminum.

GORY–GORKY

JARDIN BOTANIQUE DE L'INSTITUT AGRONOMIQUE

Gory-Gorki, Belorussia, U. S. S. R.

Director: N. F. Nikolaev (1937). Delectus Seminum.

JALTA (CRIMEA)

MOLOTOV NIKITA BOTANIC GARDEN

(GOS. NIKITAKIJ OPYTNIJ BOTANITSCHESKIJ SAD, IMENI MOLOTOWA)

KAMIANETZ–PODILSKYJ (KAMIENETZ–PODOLSKYI)

BOTANIC GARDEN (BOTANITSCHESKIJ SAD)

P. O. Box 77, Ukraine, U. S. S. R.

Established: 1930. *Director:* N. A. Shukowskyj (1937). Index Seminum.

KASAN

Botanic Garden of the University
(Botanitscheskij Sad Universiteta)

KAZAKSTAN

Jardin Botanique

Academie des Sciences, Alma-Ata, Vinogradova 18 (Kazakstan)

Director: A. J. Milorzorov (1937). Index Seminum.

Note: Located at Lat. 43° 14′ N., Long. 76° 56′ E.; altitude 900 meters.

KIEV (KIEFF, KIEW) (1)

Jardin Botanique de l'Académie des Sciences de la R. S. S. d'Ukraine

Rue Vydubetzkaja No. 49, Kiev (Ukraine), U. S. S. R.

Directors: N. Dubovik (1936). N. Ptitzyn (1937). Index Seminum.

KIEV (2)

Botanic Garden of the Botanical Institute of the Ucrainian Academie of Sciences

Established: 1838. *Area:* ? "22.5 h. plus 207 H."

Directors:

1. Schmalhausen (1879–1894)
2. Nawaschin (1895–1914)
3. Fomin (1914–?)

Serves as a public park. Open daily to the public. *Source of income:* Appropriations from the Soviet Ucrainian Government. *Arboretum and fruticetum:* 1500 species. *Species under glass:* 6000. *Publications:* Seed List ("Index Seminum"). "Journal de l'Institut Botanique de l'Academie des Sciences." *Living material* for study is supplied for the Kiew University and Institutes. *Herbaria:* Herbarium Generale, Herb. Ucrainicum, Herb. Caucasicum. *Museum:* Specimens mounted for public inspection.

KIEV (UKRAINE) (3)

Municipal Botanic Gardens

Ul. Kominterna 1

Director: N. W. Dubowik (1936).

KIROVSK (KIROBSK)

(Formerly Chibinogorsk; Leningrad obl.)

HORTUS BOTANICUS ARCTO-ALPINUS ACADEMIAE SCIENTARUM NAUK

(BOTANITSCHESKIJ SAD AKADEMIA NAUK)

Hortus Botanicus, Kirovsk, Peninsula Kola, U. S. S. R.

Established: 1932. *Area:* 1200 hectares.

Note: This Garden was established by the Academy of Sciences of Nauk "on the initiative of the Kola Expedition by Academician A. E. Fersman and the Party, Soviet, and economic organizations of the Murmansk District." It is located in the Khibinsk Mountains, Kola Peninsula. (Murmansk District, Leningrad Region), north of the Arctic Circle (67° 35′ north latitude), near the new town of Kirov (formerly Khibinogorsk) and the apatite mines. It is on a moraine on the slope of Mt. Woodyavrchorr. Its altitude ranges from 315 to 1060 meters above mean sea level. It is reported to be "the first botanical garden beyond the Arctic Circle." *Publications:* Delectus Seminum.

KOOIBUCSHEFF

BOTANICAL GARDEN

Kooibucsheff 2 (Samara), U. S. S. R. Seed List.

Affiliation: Board of Instruction of the Kooibucsheff Region.

KUJASHIZA (BEL. S. S. R.)

BOTANIC GARDEN (BOTANITSCHESKIJ SAD)

LENINGRAD (1)

MAIN BOTANIC GARDEN OF THE ACADEMY OF SCIENCES

(FORMERLY: BOTANIC GARDEN OF THE STATE UNIVERSITY)

(BOTANITSCHESKIJ SAD)

Universitetskaja nab. 7/9, Wassil, Ostrow

Established: 1st, about 1712 by Peter the Great as a Druggist's Garden. 2nd, 1824, reorganized as the Imperial Botanic Garden. 3rd, 1917, again reorganized as the Principal Botanic Garden of the U. S. S. R.

Directors:

1. F. E. L. Fischer (1843–1850)
2. K. A. Meyer (1850–1855)
3. K. K. Kuster (1855–1857)
4. E. Regel (1857–1865)
5. R. Trautvetter (1865–1875)
6. E. Regel (1875–1892)
7. A. Batalin (1892–1896)
8. A. Fischer de Waldheim (1896–?)

?. B. L. Isačenko (1928)

?. B. A. Keller (1937)

Serves as a public park. Open daily free. *Library:* Reference. About 48,000 volumes and pamphlets. *Herbarium:* More than 3,000,000 specimens. *Plantations:* Systematic, geographic, economic, local flora. Fruticetum and arboretum. Delectus Seminum. *Museum:* Open three times weekly, Tuesday, Thursday and Saturday, at three o'clock. Admission only "by order." *Free lectures* were given occasionally at the garden. Study collections of herbarium specimens, dried seeds, alcoholic (formalin) material, microscopic slides, economic plant products, and photographs were loaned to schools. *Living material,* including wild plants, was supplied when requested to both public and private schools.

Note: The above data were obtained before the World War. The only information we have been able to obtain since then is as follows, received in March, 1937, from Prof. N. I. Vavilov, Director of the U. S. S. R. Institute of Plant Industry of the Lenin Academy of Agricultural Sciences.

"The Botanical Garden in Leningrad belongs now to the Botanical Institute of the Academy of Sciences of the U. S. S. R. It has one of the biggest herbariums in our country, containing several millions of specimens. It has two kilometers of greenhouses with an enormous collection of living plants, as well as a beautiful garden. There are several laboratories. . . . In Leningrad we have only one Botanical Garden; it is called the Main Botanical Garden of the Academy of Sciences." . . . In 1912 there was the 200th anniversary of this garden and three big volumes of its history were published. . . . The Director of this Garden is Prof. B. A. Keller."

The date, 1843, given by our Petrograd correspondent before the World War, must refer to a reorganization. In the *Botanische Zeitung* (**18**: 138. 1860) there is an article, *Uber den botanischen garten in St. Petersburg,* by Prof. Ferdinand Cohn (Breslau) stating that this Botanic Garden was established by Peter the Great in 1714 (vs. 1712 implied by the date of the 200th anniversary celebration), "Eleven years after the foundation of the City," (1703). Cohn says further:

"For one hundred years the Garden made little progress, but, during the reign of Alexander the First, F. E. L. Fischer, formerly in charge of the gardens of Count Al. Rasumoffsky, at Gorenki, near Moskow, became director. Under Fischer the Garden became a first-class botanical institution."

LENINGRAD (2)

Dendrological Garden

Forest-Technical Academy, Leningrad 18. Seed List.

MINSK

Botanic Garden of the Academy of Sciences of White Russia

Established: 1930. *Area:* 98 hectares.
Director: S. P. Mjelnik (1936). Delectus Seminum.
Note: A portion of the Garden is a nature reserve.

MOSCOW (1)

Botanical Garden of the University of Moscow (Botanitscheskij Sad)

1 Meshchanskaja, 28, Moscow 10

Established: 1707. *Area:* 6 hectares.
Directors:

1. Hoffmann (1804–1824)
2. Maskymowich (1824–1834)
3. Fisher von Waldheim (1834–1860)
4. N. J. Kaufmann (1860–1870)
5. Chistakof (1870–1873)
6. Goroshakyn (1873–1900)

7. Golenkyn (1900–1931)
8. M. S. Navashin (1934–1937)
9. D. Synytzkaja (1937–)

Serves as a public park. Orangery open daily, 9:30–5; "The Park" on even days, 9:30–7. Admission: Excursionists, 20 cop; individuals, adults, 60 cop., children, 20 cop. *Source of income:* Government subsidy, admission fees, and sale of plants. *Library:* About 10,000 volumes. *Herbarium:* In the University. No separate herbariums for the Botanic Garden. *Plantations:* In "Dendropark," systematic; Orangery, geographic. Arboretum and a Fruticetum. *Publications:* Delectus Seminum; Guide. *Lectures* are given at the Garden to school children, and study material is supplied to schools. *Affiliation:* "Students and post-graduates of the University work in the Botanic Garden."

MOSCOW (2)

Botanic Garden of the College of Agriculture

MOSCOW (3)

Botanic Garden of the Timiriasev Academy of Sciences

Timiriasev Academy, Corpus 17, Cathedra Botanica, Moscow 8, U. S. S. R.

Director: P. M. Zhukovsky (1936). Delectus Seminum.

NIKITA

Government Botanical Garden

Nikita, Yalta, Crimea, U. S. S. R. Seed List

ODESSA (UKRAINE)

Governmental Botanic Garden (Gosud. Botanetscheskyi Sad)

(Hortus Botanicus Universitatis Respublicanae Odessanae)

Proletarakyi Bulwar 87

Directors: W. I. Lipskii (?–1937); I. A. Vlassenko (1937–).
Seed List.

OMSK

BOTANIC GARDEN OF THE INSTITUTE OF AGRICULTURE (OMSKOJE INSTITUT SELSKO-CHOSJAISTWENNY BOTANETSCHESKYI SAD)

Omsk (Siberia), U. S. S. R.

Director: N. Plotnikov (1937). Seed List.

Branch of the Leningrad Garden.

PENZA (VOLGA)

BOTANIC GARDEN (BOTANITSCHESKIJ SAD)

Krasnaja 36, Penza, U. S. S. R.

Director: D. G. Nazarov (1937). Delectus Seminum, Quae curatio arearum reservatarum rei publicae in regione Kujbyschevensi (Volga media) pro mutua commutatione offert.

PERM

JARDIN BOTANIQUE DE L'UNIVERSITÉ D'ETAT DE PERM

Perm II, Zaimka, U. S. S. R.

Director: E. A. Pavsky (1937). Index Sporarum et Seminum.

RIDDER (ALTAI)

BOTANIC GARDEN (BOTANITSCHESKIJ SAD)

ROSTOW–DON

BOTANIC GARDEN (BOTANETSCHESKIJ SAD)

Rostow na Donn, Potscht. jastsch 330, U. S. S. R.

Director: M. Wipirailenko (1937). Seed List.

SHITOMIR

BOTANIC GARDEN (BOTANITSCHESKIJ SAD) OF THE AGRICULTURAL INSTITUT

Shitomir, Ukraine, U. S. S. R. Katheder der Botanik

Director: J. Litwino (1936); E. I. Gorenky (1937). Index Sporarum, Seminum, Fructum.

SOTSCHI (SEW.-KAWK. KRAJ)

ARBORETUM AND FOREST EXPERIMENT STATION

Chudjakov Park

SVERDLOVSK (EKATERINBURG) (URAL)

BOTANIC GARDEN (BOTANITSCHESKIJ SAD)

4 Msl'kova

Director: Prof. Kasanski (?–1936). Index Seminum.

TASHKENT

HORTUS BOTANICUS UNIVERSITATIS ASIAE MEDIAE

Tashkent, Usbekistan, U. S. S. R.

Director: Th. Russanov (1936). Index Seminum.

TIFLIS (TBILISI) (GEORGIA) (1)

STATE BOTANICAL GARDEN (BOTANITSCHESKIJ SAD)

Tiflis, Georgia, U. S. S. R. (Caucasus)

Director: Adolph Rolloff (?).

TIFLIS (TPHILISI) (2)

BOTANIC GARDEN OF THE ACADEMY OF SCIENCES

(BOTANITSCHESKIJ SAD)

Tiflis, Georgia, U. S. S. R. (Caucasus)

Director: D. Sosnovsky (1937). Delectus Seminum.

TOMSK

BOTANIC GARDEN (BOTANITSCHESKIJ SAD)

UFA

HORTUS BOTANICUS (BOTANITSCHESKIJ SAD)

VLADIVOSTOCK (DALNIJ WOSTOK)

BOTANIC GARDEN OF THE B. I. N.

(OTDELENIE GLAWNOGO BOTANTTSCHESKOGO SADA)

VOLOGDA

BOTANIC GARDEN (BOTANITSCHESKIJ SAD)

VORONESCH (WORONESH)

BOTANIC GARDEN (BOTANITSCHESKIJ SAD)

Universitetskaja ul. 5

Director: W. Ph. Wassiliew (1937). Delectus Seminum.

WASILJEWO (MOSK.-KASANSK. SHEL. DOR.)

ARBORETUM OF THE KASAN AGRICULTURAL INSTITUTE

(DENDROL. SAD INST. SELSKOGO CHOSJAISTWA I LESOWODSTWA)

WITEBSK (BEL. S. S. R.)

BOTANIC GARDEN OF THE VETERINARY COLLEGE

(BOTANETSCHESKIJ SAD WETER. INST.)

Woropajewskaja ul. ega

United States of America

Arizona

SUPERIOR

BOYCE THOMPSON SOUTHWESTERN ARBORETUM, INC.

Established: 1924; First planting, 1928; Officially opened April 6, 1929. *Area:* 401 acres.

Directors: Franklin Jacob Crider (1924–1935); Frederick Gibson (Jan. 1, 1936–).

Note: The purpose of this Arboretum, as stated in its pamphlet, "Purpose, History, Dedication" (Superior, Arizona, July, 1930) is as follows: ". . . the specific purpose of the institution, as now conceived, is to bring together and grow, for study and possible utilization, the plants of sub-arid climates and to publish the results of such investigations." There is a special collection of Cacti. Col. Thompson said: "I have in mind more than mere botanical propagation. I hope to benefit the State and the Southwest by the addition of new products . . . to see if we cannot make these mesas, hillsides, and canyons far more productive and

of more benefit to mankind. . . . We will build here the most beautiful, and at the same time the most useful, garden of its kind in the world."

Source of Income: Income from endowment provided by the founder, Col. William Boyce Thompson. Through Special Usage Permit from the U. S. Federal Forest Service, the total area available for Arboretum purposes has been increased to 1,127 acres. The mean rainfall is 17 inches, about equally divided between mid-summer and winter.

California

ANAHEIM

RANCHO SANTA ANA BOTANIC GARDEN

P. O. Box 327, R. F. D. 3, Anaheim

Executive Office: 3210 West Adams St., Los Angeles.
Established: 1927. *Area:* 200 acres.
Director and Founder: Mrs. Susanna Bixby Bryant.
Herbarium; Library (reference).

The announced primary purpose is to provide facilities for research in plant life by assembling in one accessible locality a living collection of the different species of plants indigenous to California that will grow in the Santa Ana Cañon, Orange County, 40 miles East of Los Angeles. Educational work is planned in cooperation with schools and colleges in their nature study and botany classes by means of field days at the Ranch. *Publication:* Report, April 1, 1931.

BERKELEY

UNIVERSITY OF CALIFORNIA BOTANICAL GARDEN

University of California, Berkeley, Calif.

Established: July 1, 1934. *Area:* 60 acres. The first Garden was established in 1891.
Director: T. H. Goodspeed (Dec. 1, 1934–).

Open free to the public daily, 9 a.m.–5 p.m. *Source of Income:* Budget of University of California and private benefactions. Library and Herbarium not distinct from those of the University.

An Arboretum and Fruticetum under development as of 1936. *Plantations:* Systematic and Morphologic. Himalayan Area. *Publications:* "Leaflet" series: taxonomic, morphologic, and cultural notes on Garden collections. Plant material supplied to classes in the University.

LOS ANGELES (1)

California Botanic Garden (Abandoned)

(Formerly) 600 Mandeville Canyon Road, Los Angeles

Established: 1927. *Area:* 800 acres.
Director: Elmer Drew Merrill (1927–1929).

Note: Owing to the economic depression this Garden was abandoned in 1930. The area has been built up as a residential section. "The only thing that ever came out of our ideal was the herbarium Dr. Merrill purchased and which was subsequently presented to the University of California at Los Angeles."

Publications: Members Bulletin, June, 1928–May, 1929; Booklet of Information (no date; about 1929); Descriptive and Historical Material, 1928.

LOS ANGELES (2)

Rancho Santa Ana Botanic Garden

Executive Office: 3210 West Adams Street, Los Angeles, Calif.
Garden situated in Santa Ana Canon, Orange County, California

Established: 1927. *Area:* Approximately 200 acres.
Directors: Self perpetuating Board of five Trustees.

Open free to the public on Thursdays during April, May, and June by card. *Source of income:* Endowed by Susanna Bixby Bryant in memory of her father, John W. Bixby. *Library:* Approximately 2000 volumes. *Herbarium:* 11,694 specimens, of which 8204 are mounted. *Plantations:* Restricted to native plants of California. Plantings of trees and shrubs, mainly by families, with variations on account of special requirements. *Publications:* First privately printed report 1931. Descriptive Garden pamphlet 1933. *Lectures* are given occasionally to school children at the Garden. *Living material* occasionally supplied for study to local schools.

SAN MARINO

Huntington Botanical Garden

Established: 1928. *Area:* 200 acres.
Board of Directors:

1. Henry M. Robinson, Chairman
2. George Ellery Hale
3. Archer Milton Huntington
4. Robert A. Millikan
5. Henry S. Pritchett

Open free, daily (except Mondays and the 1st and 3rd Sundays of each month), from 1:15 until 4:30 p.m. *Source of income:* Trust Endowment. Owned and administered by the Henry E. Huntington Library and Art Gallery. *Library:* Approximately 3000 volumes and pamphlets. *Plantations:* Systematic and Geographic. Arboretum. Publications: "The Genus Cereus," by Dr. E. Werdermann. Supplies surplus living matter to schools.

SANTA BARBARA

Blaksley Botanic Garden

P. O. Box 198

Established: 1926. *Area:* 30 acres (including a wooded terrace). Use of 15 more acres. A memorial to Henry Blaksley, father of the late Anna Dorinda Blaksley Bliss. Located on Mission Canyon Road.

An exhibition garden of native plants grown under horticultural conditions adapted to private gardens and for roadside planting. Drought-resistant plants.

Directors: Elmer J. Bissell, M.D. (1926–1936), who purchased the land and developed and landscaped it in association with his wife, Ervanna Bowen Bissell; Maunsell Van Rensselaer (1936–)

Source of income: Supported by Mrs. W. G. Bliss and the Directors. *Serves as public park.* Open free daily from sunrise to sunset. Open to college students and public-school pupils for botanical study; supervised instruction. *Library:* Outdoor bookshelves of reference for use in garden. Book-table in Chaparral

section. Books and nature magazines. Bird-books (field glasses on application to caretaker). A retired place for reading, study of birds and plants by families. *Music:* Classical concerts on Sunday and three times a week "to draw people and interest them in botany." *Plantations:* Systematic, ecologic, geographic. Special section of flora of Santa Barbara Channel Islands. Special collection of *Ceanothus*. *Publications:* Popular leaflets in form of notes on plants and geology. *Affiliations:* The Santa Barbara Museum of Natural History holds the deed to the Garden, but is not financially responsible for maintenance. The Garden "serves as an 'outdoor wing' of the Museum."

SANTA MONICA

BOTANIC GARDEN OF UNIVERSITY OF CALIFORNIA AT LOS ANGELES

2460 Euclid Ave.

Connecticut

HARTFORD

The Superintendent of Parks

Area: 260 acres.

Park Superintendent: George H. Hollister.

During 1935 a botanical survey was made, with Federal Works Progress Administration (WPA) labor, to determine what trees, shrubs, and herbaceous plants were on the site. The appropriation was $470. In 1936 preliminary plans were being made by a landscape architect. As of November 27, 1936, the development of the Garden had not yet been begun.

NEW HAVEN

MARSH BOTANICAL GARDEN

Established: 1900. *Area:* 12 acres.

Directors:

1. James W. Toumey (1900–1919)
2. Committee (Henry S. Graves, Chairman) (1920–1926)
3. George Elwood Nichols (1927–)

Serves within limits as a public park. Admission free, daily. *Source of income:* Yale University, general funds. *Library:* Departmental library of the University Department of Botany. *Her-*

barium: Herbarium of the Department of Botany. *Arboretum:* None has been definitely organized, but several plantings of trees and shrubs on University grounds are planned along arboretum-fruticetum lines. *Plantations:* Systematic, native plants; educational tulip garden, iris garden, rock garden displays. *Publication:* Seed Exchange List (none since 1924). *Affiliation:* With Yale University.

NEW LONDON

Connecticut Arboretum at Connecticut College

Established: 1931. *Area:* 70 acres.
Director: George S. Avery, Jr. (1931–).

Serves within limits as a public park and is open at all times, free of charge. *Source of income:* Appropriations by Connecticut College and gifts of friends. *Herbarium:* 6000 specimens. Plantations: Systematic. *Publication:* Bulletin, published once yearly, starting 1934.

STORRS

The Agricultural Botanic Garden of the Connecticut Agricultural College

Established: 1909. *Area:* 1 acre.
Director: A. F. Blakeslee (1909–1915).
Source of income: Annual appropriations by the college.
Plantations: Systematic, economic, ecologic, arboretum (100 species), local flora.

Note: This Garden was founded primarily as an outdoor museum and laboratory for the Department of Botany of the college. It supplied study material to the regular college classes and the summer school. The entire college campus was laid out by a landscape architect, and a planting plan adopted with reference to future walks, drives, and buildings, and with the aim of developing the campus as a scientific arboretum.

We are informed (1936) that after 1915 this Garden underwent a gradual decline and was abandoned in 1928, when it was assigned to the Department of Floriculture of the College and used for a display of herbaceous ornamentals.

District of Columbia

WASHINGTON (1)

United States Botanic Garden

Established: May 8, 1820. *Area:* 5 acres. Increased, 1824, to 12.5 acres.

After about 20 years the Garden was discontinued and the property, which had been assigned to the Columbian Institute for botanic garden purposes, reverted to the Federal Government. Thomas Jefferson, John Adams, James Madison, and Lafayette were members of the Institute and active in promoting the Botanic Garden.

Re-established: May 1850, by Act of Congress, on the present site on the Mall. The name "Botanic Garden" was not officially applied to the site until August 18, 1856, when the Joint Committee on the Library was charged by Congress with its administration.

Directors:

1. William D. Brackenridge (1842–1852)
2. William R. Smith (1852–1912)
3. Charles Leslie Reynolds (1912–1913)
4. George W. Hess (1913–1934)
5. David Lynn (architect of Capitol), acting (July, 1934–)

Note: According to a preliminary Report on the United States Botanic Garden by the House (of Representatives) Committee on the Library (73rd Congress, 2nd Session. House Committee Print. Congressman Kent E. Keller, Chairman; John G. Bradley, Clerk, Washington, 1934), the activities of the Garden in recent years "have consisted mainly in the purchase, care, and distribution of growing plants. . . . Comparatively speaking, propagation, experimentation, and kindred activities have been limited. Another activity of the Garden . . . is the giving away of growing plants and cut flowers to members of Congress and friends. . . . Its activities as an educational institution . . . as a scientific establishment . . . or as a botanic garden within the definition previously submitted, are wholly negligible."

The same Report states that the cost of this Garden has varied from $5000–$6000 a year (during the first years) to a maximum of $173,960 in 1930, with a total of $3,511,180 for the entire

period 1842–1934, an average for the 92 years of less than $40,000 a year. This does not include the cost of building and grounds of the new conservatory in 1927, $1,862,538, which would bring the average to about $58,500 per year.

In 1921 Representative Langley introduced a bill (H. R. 2166, 67th Congress, 1st Session) "To increase the area of the United States Botanic Garden." Its removal from its old location on the Mall was necessitated by an Act of Congress locating the General Grant Memorial (completed about 1920) on the site of the Garden. The old site (about 12 acres) was between Maryland Avenue (on the West) and Pennsylvania Avenue (on the East) and the Capitol Grounds and Third St., S.W. The new site lies south of Maryland Avenue.

This is chiefly an educational display garden, as the botanical research, herbarium, and botanical library are provided for under other branches of the Federal Government. In 1933 a new Conservatory, costing $604,000, was completed on the corner of Maryland Avenue and First Street, Southwest.

WASHINGTON (2)

National Arboretum

Established: The Congressional Act authorizing the establishment of this Arboretum was passed March 4, 1927, and became a law on the signature of President Coolidge.

Area: Total present (1937) area, 386 acres. There is an area of about 400 acres of federal land which may later be added.

Director: An office with the title, Director, is contemplated; in the meantime the administrative head will be an Acting Director. Dr. Frederick V. Coville was Acting Director from the beginning until his death in January, 1937. His successor has not yet (June, 1937) been appointed.

Plantations: Up to 1937 no planting has been done except a small nursery. Care has been given to existing native plants on the property, to soil improvement, and preliminary development of roads and fences.

WASHINGTON (3)

Medicinal and Drug Plant Gardens

Division of Drug Plants, Bureau of Plant Industry, U. S. Dept. of Agriculture, Washington, D. C.

Mimeographed lists of the plants grown may be obtained on request.

Florida

CHAPMAN FIELD

Fairchild Botanical Garden

A proposal for a tropical botanic garden has been made in a publication, " An argument for a botanical garden in south Florida, to be called the Fairchild Botanical Garden," by Marjory S. Douglas (Kells Press, Coral Gables, Florida). The site suggested is a frost-free area in the extreme southern part of Florida, near Chapman Field, where the U. S. Dept. of Agriculture maintains a Plant Introduction Garden for growing tropical plant introductions.

SEBRING

Florida Botanical Garden and Arboretum

Established: 1936. *Area:* More than 1500 acres.

Direction: The Garden is controlled by the Florida Botanical Garden and Arboretum Association. The first president was Dr. Abel J. Grout (1936–1937); second president, Col. F. N. K. Bailey, Sebring.

The Garden and Arboretum occupy Section 4 of the Highlands Hammock State Park.

Source of income: Developmental work has been done by the CCC (Civilian Conservation Corps), initially Highlands Camp SP–3, later changed to a new site on Lake Jackson and designated as SP–10. The new site was contributed by the Hooker Hammock Farms Corporation. In addition to the Federal Funds (CCC), appropriations have been made by the State of Florida, the City of Sebring, and the Highlands County Commissioners. Numerous private organizations and individuals have made contri-

butions. *Library and Herbarium* have been started. *Plantations:* Azalea Garden (donated by the Florida Federation of Garden Clubs; Palm Garden; Dahlia Garden; Taxonomic Garden; Nursery. In the Arboretum section 8500 trees and shrubs have been planted. *A Wood Collection*, including species native to Florida and others, is being prepared. *Publications:* 1. Report of the Florida Botanical Garden and Arboretum. June 1, 1936, by A. C. Altvater, Project Superintendent, Highlands Camp SP–3, National Park Service. 2. Report on the Botanical Activities of the Florida Botanical Garden and Arboretum. June 1, 1936, by J. B. McFarlin, Wild Life Technician, Highlands Camp SP–3, National Park Service. 3. U. S. Department of the Interior: National Park Service Branch of Planning and State Cooperation, Sebring, Florida, February 20, 1937. By A. C. Altvater, Project Superintendent, Highlands Camp SP–10. This contains a Report by Dr. Abel J. Grout, then president of the Florida Botanical Garden and Arboretum Association. The above three reports were published in mimeograph (or multigraph) form. There is also a small printed folder, anonymous, entitled, "Florida Botanical Garden and Arboretum: A Going Project."

Idaho

MOSCOW

Charles Huston Shattuck Arboretum

Affiliation: University of Moscow.

Reports more than 9000 specimens under cultivation.

Illinois

CHICAGO (1)

Dune Forest Gardens (Abandoned)

Dune Forest Company, 77 West Washington St., Chicago

Established: 1927. *Area:* 100 acres.

Director (In charge): Dr. Paul C. Standley of the Field Museum, Chicago. (1928–1930)

Note: About 1927 The Dune Forest Company subdivided a piece of wooded and hilly property in the sand dune region of northern Indiana, adjacent to the Indiana Dunes State Park. It was the plan of the Forest Dune Company to "improve" 100 acres, and to leave the balance in its natural condition. During

the world-wide economic depression the property was lost to the owners, and apparently the project, which started out with so much promise, has been abandoned.

CHICAGO (2)

(Botanic Garden of the University of Chicago)

Department of Botany, Chicago University

An Associated Press dispatch, in 1934 announced that the University of Chicago had "set aside a tract of land for the establishment of a botanic garden at some future date." Official information received from the University Department of Botany, states that the University "has no botanic garden properly so-called, nor do we term the experimental plots a botanic garden."

CHICAGO (3)

Pilcher Arboretum

(In Marquette Park)

LISLE

Morton Arboretum

Lisle, Du Page County, Illinois

Established: Fall, 1921. Administration Building in memory of Mr. Joy Morton, founder, completed November, 1935. *Area:* 419 acres.

Directors:

Mrs. Joseph M. Cudahy, Chairman of Board
C. E. Godshalk (?–)

Admission: Free, daily, from sunrise to sunset. *Source of income:* Endowment ($300,000) made by the late Joy Morton, founder. *Library:* 2000 volumes. *Herbarium:* 10,000 specimens. The Arboretum (with Fruticetum) is situated on State Highway No. 53, in Du Page County, approximately 25 miles west of the Chicago Loop, 1 mile north of Lisle, and 3 miles south of Glen Ellyn. *Arrangement:* Systematic, geographic, horticultural. Plants for landscape effect are chiefly along the boundaries of the Arboretum and borders of streams, lakes and drives. In the forestry plantings are large groups of trees valuable for forestry purposes, whose economic and practical value is being tested. *Publication:* Bulletin of Popular Information.

Indiana

HUNTINGTON

LOEW BOTANICAL GARDEN AND ARBORETUM

Huntington College, Huntington

Dedicated: June 12, 1937. *Area:* Garden, 3.5 acres; Arboretum, 40 acres.

Director: Fred A. Loew (1937).

Open free daily. Plantations: Largely systematic, with more than 300 species. It is planned to devote one section entirely to native grasses. *Arboretum* now well wooded with many of the trees and shrubs native to the region. "Others will be planted until it is complete. . . . The development of this garden and arboretum which is the only project of its kind in the state, is the work of Fred A. Loew, now professor of botany, and has been named after him." (*Science* **86**: 99. 30 July, 1937.) The dedication address was given by Dr. Ernst A. Bessey, professor of botany, Michigan State College, and from 1911 to 1914 director of the Beal Botanic Garden, East Lansing.

INDIANAPOLIS (1)

BOTANIC GARDEN AND ARBORETUM

General Superintendent, Department of Public Parks

Note: The following information was supplied under date of March 22, 1937, by Mr. A. C. Sallee, Gen'l. Supt.

"Several years ago the late John H. Holliday, founder of the Indianapolis *News,* presented his country estate, consisting of some 80 acres, to the City of Indianapolis to be used for a public park. On account of the unprecedented business depression during the past few years and the uncertainty of raising taxes, this tract has not been developed as a city park. Recently Mr. Willard N. Clute, the Indiana Nature Study Club, and members of the Indianapolis Council of Garden Clubs, which organization has cooperated with the Park Board in a campaign of city beautification, have agreed that the Holliday estate would be the ideal site for a botanic garden and arboretum."

A landscape architect has been employed to assist in the development of this garden. It is planned to perfect a strong citizen organization to cooperate with the Park Board and provide con-

tinuity for the operation of the garden, possibly the raising of an endowment fund, and the employment of a "Botany Director."

INDIANAPOLIS (2)

Botanical Garden of Butler University

Butler University, Indianapolis, Indiana

Established: 1928. *Area:* 15 acres.
Director: Willard N. Clute (1928–)

Serves as a public park. Open free every day, all day. *Source of income:* Funds appropriated by the University. *Library:* About 3000 volumes available at the University Library. *Herbarium:* 35,000 specimens. There is an Arboretum and a Fruticetum. *Plantations:* Largely systematic. There is a Herbaceous garden, Sand garden, Native Wildflower garden, Rock garden, and Water garden. *Special lectures* are given to school children at the garden, also to clubs, garden societies, and general public. *Study material* is supplied to local schools on application.

MUNCIE

Botanic Garden of Ball State Teachers College

About 18 acres adjoining the college campus. *Source of income:* State appropriations.

Iowa

GRINNELL

Botanic Garden of Grinnell College

Established: 1908. *Area:* 1⅝ acres.
Director: H. S. Conard (1908–)

The Garden was established by subscription of funds, the subscriptions closing December 31, 1908, payable within three years. The sum now set aside as a special endowment for the garden is $1630.00. Some additional funds are supplied by the botany department in return for materials used by the department. A considerable amount of work in the garden is done as class exercises by students of horticulture. The first plantings were in 1909, with 14 species. In 1910 about 100 more were added. At present there are in the garden about 200 herbaceous species and varieties and about 200 of trees and shrubs under cultivation. The trees

will be removed to another place before they grow large. The garden is strictly for herbs and shrubs. The local flora is largely represented.

The Garden is administered by the Professor of Botany of Grinnell College. The College Laboratories contain herbaria of about 10,000 sheets. No seed list or other publications are issued, but seeds and plants are gladly supplied when possible.

Kentucky

LEXINGTON (1)

KENTUCKY BOTANIC GARDEN

Lexington

Established: 1927. *Area:* About 7 acres.

Directors: A joint committee from the Lexington Garden Club and the University of Kentucky. Miss Mary L. Didlake, Chairman.

Serves as a public park. Open free daily. *Source of income:* Appropriations from University and donations from Kentucky Garden Clubs. *Library:* Those of the University and the Experiment Station. *Herbarium:* Those of the University and the Experiment Station. There is an arboretum, but no fruticetum. *Plantations:* Mainly under ecologic heads. *Affiliation:* The Garden is affiliated with the University of Kentucky and is under its management.

LEXINGTON (2)

BOTANIC GARDEN OF TRANSYLVANIA UNIVERSITY (Abandoned)

Louisiana

NEW ORLEANS

ARBORETUM

In 1934 plans were initiated in New Orleans for the development of an Arboretum as a part of the City Park extension. Much preliminary work has been done on the site by W.P.A. (U. S. Works Progress Administration) labor. The New Orleans Academy of Sciences and the New Orleans Garden Society have been interested in furthering the project by securing funds and otherwise.

Maine

THOMASTON

KNOX ARBORETUM

R. F. D. No. 1

Established: 1908. *Area:* 100 acres.
Director: Norman Wallace Lermond (also Curator & Librarian) (1908–).

Serves as a public park. Open free, daily. *Source of income:* Public contributions. *Library:* 500 volumes; 700 pamphlets. This is the Knox Academy Library. *Herbarium:* Approximately 800 specimens. *Plantations:* Systematic. *Publications:* Lists of trees and shrubs, two having been issued by the Garden to date (1934). *Museum:* Under construction (1934). *Affiliation:* Owned by the Knox Academy of Arts and Sciences, Thomaston.

Maryland

BALTIMORE

BOTANIC GARDEN OF THE JOHNS HOPKINS UNIVERSITY

Established: 1909. *Area:* 2 acres.
Director: Duncan S. Johnson (1909–Feb. 18, 1937)
Plantations: 1. Morphologic-ecologic; 2. Structure and ecology of reproductive organs; 3. Systematic; 4. Useful and ornamental shrubs.

Massachusetts

CAMBRIDGE

BOTANIC GARDEN OF HARVARD UNIVERSITY

Botanic Garden, Garden Street, Cambridge, Massachusetts

Established: 1807 (1805?). *Area:* 7 acres.
Directors (or Chief Administrative Officers):

1. William Dandridge Peck (1807–1822)
   (Vacant 1823–1824)
2. Thomas Nuttall, Curator (1825–1834)
3. Asa Gray (Professor in Charge) (1842–1873)
4. Charles Sprague Sargent, first Director (1873–1879)
5. George Lincoln Goodale, Director (1879–1909)

6. Oakes Ames, Director (1909–1922)
7. Stephen F. Hamblin, Director (1923–1930)
8. Robert H. Woodworth, Curator (1930–1935)
9. Elmer D. Merrill, Supervisor (1935–)

Source of income: A small endowment and gifts. Has received some aid from Harvard College in compensation for illustrative material supplied. *Library:* The Garden has on its premises, and of easy access, the Library of the Gray Herbarium amounting to about 39,000 volumes and pamphlets. *Herbarium:* The Gray Herbarium, of Harvard University (about 800,000 sheets). *Plantations:* Systematic. *Arboretum and Fruticetum:* (Harvard University, of which the Botanic Garden is a small part, has all of these well developed at the Arnold Arboretum, *q.v.*). *Instruction:* The Garden is constantly used by instructors connected with different parts of the University. Its function is to supply illustrative material, but classes from Harvard College are often brought, as are classes from neighboring schools to the Garden. *Affiliation:* Formerly a separate Department of Harvard University. Since 1928 a part of the Department of Botany of the University.

Announcement Concerning The Harvard Botanic Garden

"The Harvard Botanic Garden, hitherto a separate department of the University, has been transferred to the Department of Botany. President Lowell has given out the following statement in connection with the change: 'Some years ago a number of people interested in gardening asked the corporation to conduct the garden for horticultural objects, offering to pay the expenses involved, which the corporation was glad to do so long as the cost was thus defrayed. After a while the committee became weary of raising subscriptions, and last spring it was decided that in view of this fact, and of the comparatively small scientific value of horticulture to the University, the Garden had better be used for scientific purposes. The direction of the garden has, therefore, been transferred to a member of the Department of Botany, who will use the small income of the endowment for the benefit of that Department.'"—*Science* **70**: 605, December 20, 1929.

Note: For Atkins Institution, Soledad, Cuba, see under Cuba, Soledad.

JAMAICA PLAIN

ARNOLD ARBORETUM OF HARVARD UNIVERSITY

Established: 1872. The principal collections of trees and shrubs were not planted until 1886. *Area:* 260 acres.
Director: Charles Sprague Sargent (1872–1927).
Supervisors: Oakes Ames (1928–1935); Elmer D. Merrill (1936–).

Serves as a public park. Open free, daily, from sunrise to sunset. *Source of income:* Interest from endowment, special contributions, municipal appropriations for construction and maintenance of carriage drives and walks. *Library:* About 4100 bound volumes; 10,000 pamphlets; 17,000 photographs. *Herbarium:* About 390,000 specimens, representing the woody plants (only) of the world; Carpological collection 8000; Wood collection 4000. *Conservatories:* As the arboretum includes only woody plants, hardy in the climate of Jamaica Plain (near Boston), there are no plant houses except a small propagating house. *Plantations:* Systematic.

1. *Arboretum.* Stated by the authorities (in 1934) to contain the largest number of species of woody plants assembled in any one place in America. (More than 6500 species and varieties of trees, shrubs, and vines representing about 339 genera.

2. *Fruticetum.* The Shrub Collection "is arranged in beds ten feet wide, with a total length of 7765 feet, and separated by grass covered paths five feet wide. In these beds the shrubs are planted in a single row and in botanical sequence, all the species of a genus being thus brought together. In this collection only those genera are included in which all the species are shrubs, while those genera which contain trees and shrubs, like Cornus, Syringa, Viburnum, Rhamnus, Rhus, Evonymus, Rhododendron, etc., are planted in other parts of the Arboretum and as near as possible to the other genera of their natural families.

"The object of this special Shrub Collection is to enable students, landscape-gardeners, and nurserymen to compare readily the different shrubs which are available for planting in the Northern States; to make the collection as valuable as possible for this purpose only well-known hardy shrubs are included in it. Less hardy and all imperfectly known shrubs will be found in more sheltered and less conspicuous positions, where supplementary col-

lections of most of the prominent genera of shrubs are maintained.

" Three sides of the shrub ground are surrounded by a trellis on which the vines of the collection are trained, all the species of each genus being planted together."

3. *Hawthorn collection.* " About 1300 species, forms, and varieties of this genus are now represented in this collection. The plants were nearly all produced at the Arboretum, from seeds carefully gathered from the individual trees which served as the types from which the species were described. The plants are in square beds, and several individuals of each species are planted together; then as these grow they are reduced to one or two plants of each variety. Diagrams of each bed are kept on cards, and the name, history, position, and final distribution of each individual are recorded."

4. *Pinetum,* containing the pines and other Gymnosperms.

Publications: Shaw, George Russel, The pines of Mexico, Boston, 1909. Wilson, E. H., Vegetation of Central and Western China. (500 photographs), 1911. The Bradley Bibliography, a guide to the literature of woody plants published before the beginning of the twentieth century. Plantae Wilsonianae, an enumeration of the woody plants collected in western China, etc. A guide to the Arnold Arboretum (with map). Bulletin of Popular Information—issued during spring and autumn, about 12 numbers per year. $1.00 per year. Journal of the Arnold Arboretum—Quarterly. Contributions from the Arnold Arboretum—issued at irregular intervals. The Genus Pinus. Catalogue of the Library of the Arnold Arboretum. The Cherries of Japan. The Conifers and Taxads of Japan. The Forest Trees of New England.

Note: See also Cuba: Soledad (Cuban branch of Arnold Arboretum).

LEXINGTON

The Lexington Botanic Garden

93 Hancock St.

Established: 1930. *Area:* 10 acres.

Director: Stephen F. Hamblin (1930–).

Admission free daily. *Source of income:* Memberships and gifts. *Plantations:* Wholly for herbaceous plants. Engler and Prantl system. Specializing on North American species and rock garden plants. *Publications:* Seed Exchange List; Bulletin; Lexington Leaflets.

NORTHAMPTON

Botanic Garden of Smith College

Established: 1893. *Area:* About 4 acres for the Herbaceous Garden; the Arboretum and Fruticetum include the College Campus of 80 acres, and the woods adjoining.
Directors: William F. Ganong (1894–1932).

Since 1932 there has been no official with the title of director, but the Garden has been under the management of the Botanical Department of the College, Miss Sara Bache-Wiig, Chairman (1936).

Open free, daily, to the public. *Library:* That of the Department of Botany. Specially rich in books on the history of botany and botanical education. *Herbarium:* About 22,000 sheets. *Plantations:* Systematic. Hardy Herbaceous Plants, 1000. Arboretum: 250 species. Species under glass, 1200. Fruticetum: 500 species.

SOUTH HADLEY

Clara Leigh Dwight Garden

Mount Holyoke College, South Hadley, Mass.

Established: 1878. *Area:* 10 acres, garden and arboretum.
Directors:

1. Lydia Shattuck (1878–1887)
2. Henrietta E. Hooker (1887–1900)
3. Asa S. Kinney (1900–)

Open free, daily, except Sundays, 9 a.m. to 5 p.m. *Source of income:* Income from endowment and College. *Herbarium:* Over 8000 specimens, representing nearly 1600 genera. *Plantations:* Herbaceous garden, arboretum (about 150 species of trees and shrubs). *Species under glass:* 300. Herbaceous plants out-of-doors: 125 species.

WALTHAM

Botanic Garden of the Middlesex College of Medicine and Surgery

An Associated Press dispatch of June 15, 1928, announced that this college was developing its then newly acquired campus at Waltham as a botanic garden. "More than an acre will be cultivated for botanical study" from the medical point of view. No reply to our questionnaire.

WELLESLEY

Alexandra Botanic Garden and Hunnewell Arboretum of Wellesley College

Established: 1923. *Area:* 24 acres. 20 additional acres for genetics, ecology, and horticulture.

Directors: Margaret C. Ferguson (1923–1932); Helen I. Davis (1932–).

Open free, daily. Source of income: Endowment, $60,000. In addition Wellesley College maintains the large trees (pruning, spraying, etc.), walks, electric lights, and water supply. *Herbarium:* More than 85,000 specimens. Arboretum was formerly "The Horatio Hollis Hunnewell Arboretum."

Michigan

ANN ARBOR (1)

Botanical Gardens of the University of Michigan Department of Botany, Ann Arbor

Established: 1914. *Area:* 51 acres.

Directors: Henry Allan Gleason (1915–February, 1919) Harley Harris Bartlett (1919–).

Source of income: Budget of the University of Michigan. *Plantations:* The more notable features of the outdoor plantings are an extensive wild rose collection, a large collection of species and varieties of *Prunus,* and a great many of the varied introductions of the Office of Foreign Plant Introduction of the U. S. Department of Agriculture.

The School of Forestry of the University maintains its nurseries at the Gardens. The greenhouse collections are (1937) chiefly remarkable for the large cactus collection. The facilities of the Garden provide for bringing into flower, for identification and study, many plants which are collected by various university expeditions.

Affiliation: The Botanical Gardens constitute an independent department of the College of Literature, Science, and the Arts. Facilities for scientific investigation are offered to all Departments of the University, and have been utilized, not only by the Department of Botany, but also by the School of Forestry and Conservation, the School of Pharmacy, and the Department of Zoology. *Historical Notes:* Dr. H. H. Bartlett, Professor of Botany, University of Michigan, has kindly supplied the following historical information:

The earliest intimation that there was to be a Botanical Garden dates from the reorganization of the University in Ann Arbor just a hundred years ago, when Asa Gray, the first professor to be appointed, made a plan for the development of the campus, which showed the eastern half of the original forty acres as "The Botanical Garden." Gray was sent to Europe to buy books, and because of his appointment at Harvard he never returned to Ann Arbor, and this plan remained unrealized.

A Botanical Garden on the campus was ultimately established. The first notice of it in the University Calendar appears in the volume for 1901–1902. It was under the direction of Julius Otto Schlotterbeck, then Assistant Professor of Pharmacognosy and Botany in the School of Pharmacy, and occupied an area in front of and extending to the westward of the General Library. The only recognizable trace of it that now remains is a tree of *Fraxinus Ornus* near the northwest corner of the Library.

The space on the campus for the Garden was too small. The City of Ann Arbor owned thirty acres of land along the Huron River which it was willing to use as the nucleus of a new Botanical Garden. Additions were made to it by gifts to the University from Dr. Walter H. Nichols and his wife and from Professor F. C. Newcombe of the Department of Botany.

The development of the Huron River site was begun in 1906, and in the Calendar for 1906–1907 Assistant Professor George Plummer Burns, of the Department of Botany, is listed as Director of the Botanical Gardens. This position he held from 1907 to 1910, being succeeded by Charles H. Otis as "Curator of the Botanic Garden and Arboretum" (1910–1912). The Department of Botany continued the administration until 1915. The land was hilly and although admirably suited for permanent display plantings of woody species and for landscape effects, it offered no sufficient flat area for a large greenhouse plant and experimental fields, in which the Department of Botany was especially interested.

The University therefore purchased, in 1914, the initial twenty acres of the present site to the west of Packard Road on the line between Ann Arbor and Pittsfield townships. The botanists transferred to the Packared Road site in 1915, leaving the land along the river subsequently known as the "Nichols Arboretum" to be administered by the Department of Landscape Design. This arrangement is still (December, 1936) in effect. Dr. Henry Allan Gleason was the first Director of the Botanical Gardens on the Packark Road site.

ANN ARBOR (2)

Nichols Arboretum

Established: About 1907. *Area:* About 90 acres.
Director: Aubrey Tealdi (1936). Plans are under way to increase the area to 160 acres.

BATTLE CREEK

Leila Arboretum

City Hall, Battle Creek, Michigan

*Established:*1922. *Area:* 255 acres.
Director: City Commissioner of Public Buildings and Grounds.

Open free from sunrise to sunset. *Source of income:* City appropriations. *Plantations:* Systematic. *Lectures* are given to school children at the Garden. *Study collections* are loaned to the schools.

EAST LANSING

Beal Botanic Garden

Michigan State College, East Lansing

Established: 1877. *Area:* Slightly more than 3 acres.
Directors:

1. W. J. Beal (1877–1910)
2. Ernst A. Bessey (1911–1914)
3. H. R. Darlington (1915–1930)
4. H. L. H. Chapman (Superintendent) (1931–)

Serves as a public park. Open free, daily. *Source of income:* Appropriations from Michigan State College. No separate appropriations. *Library:* The Library of the Botany Department. *Herbarium:* About 90,000 specimens, belonging to the Department of Botany. *Plantations:* Systematic, economic, local flora. *Conservatories:* A small range. *Publications:* Seed Exchange List (annually). *Lectures* are given to school children at the garden on request. Living material supplied for study to local schools occasionally.

" Perhaps the greatest service that the Garden does is as an acclimatization experiment station. Thanks to the fraternal relations that exist between all Kew graduates, Superintendent Chapman obtains each year from Kew men all over the world, hundreds of kinds of seeds of plants which he tests out here as to their adaptability and desirability under Michigan conditions. Of course, only a very few each year prove to be valuable. These are mostly plants which are not to be found in the general nursery trade. When a plant proves to be desirable a sufficient number are propagated so that these can be exchanged for other valuable plants with various growers in Michigan. In this way, the growers have these new things available and at the same time several desirable plants are added to their collection.

" The Garden is visited in the summer by thousands of people. Excursions are made by Garden Clubs from points as far as a hundred miles away. Several schools have the habit in May of bringing two or three truckloads of children to the Garden, some of them coming as far as ninety miles. On days like July 4, May 30 and Labor Day, sometimes from five to ten thousand people visit the Garden."

HILLSDALE

Botanic Garden and Arboretum of Hillsdale College

YPSILANTI

Science Gardens

Michigan State Normal College

Established: 1904. *Area:* One acre.
Directors: W. H. Scherzer (1904–1919); J. M. Hover (1919–).

Open free, daily. Source of income: State appropriation. *Herbarium:* About 4000 specimens. *Arboretum* of native trees. *Fruticetum* of the more common ornamentals. Plantations are arranged systematically, and are intended primarily to serve as teaching collections for botany classes. *Publication:* Flora of Washtenaw County, by R. A. Walpole. *Special lectures* are given to school children, and study collections are loaned "to training schools only." *Affiliation:* Michigan State Normal College.

Minnesota

LAKE CITY

Underwood Arboretum and State Game Refuge

Established: January 1, 1931. A memorial to J. M. Underwood. *Area:* 500 acres.
Director: R. D. Underwood. Open free, daily.

MINNEAPOLIS (1)

The Medicinal Plant Garden of the College of Pharmacy, University of Minnesota

Established: 1892–93 by Dean Frederick J. Wulling. *Area:* 3 acres.
Director: Frederick J. Wulling (1892–).

Open free to public inspection. High school classes, women's clubs, and other organizations are frequent visitors. *Source of income:* Garden produces no monetary income except in a small way from the digitalis which it prepares for those pharmacists who have physicians' specifications for Minnesota University digitalis. The expenses of the Garden are carried by the general College of Pharmacy Budget. The Garden is not supported by any

special governmental appropriation, but about 49.5 per cent of the Pharmacy Budget, out of which the Garden is maintained, comes from the State of Minnesota. *Library:* The departmental library of the College of Pharmacy contains about 4000 volumes, and all of the pharmacy periodicals of this country and the important ones of other countries. The students in pharmacy have access to all of the library facilities of the University. *Herbarium:* About 5000 specimens, but the students in pharmacy have access to the herbarium and other facilities of the Department of Botany, College of Science, Literature and Arts. *Plantations:* Largely systematic.

MINNEAPOLIS (2)

University of Minnesota Botanic Garden

Area: 3 acres. Administered by the Department of Botany chiefly as a source of study material.

NORTHFIELD

Carleton College Arboretum

ST. CLOUD

State Teachers College

A letter of December 26, 1934 from the Department of Biology, State Teachers College, St. Cloud, states as follows:

"Our State Teachers College has acquired about a square mile of islands in the Mississippi river near the College. In addition we own one hundred and twenty acres which formerly was a granite quarry. We would like very much to establish (1) a botanical garden and tree plantings on the quarry site and (2) an arboretum on the islands."

As of the above date, nothing had been done toward the development of these areas.

Missouri

ST. LOUIS

Missouri Botanical Garden

Established: The grounds locally known as "Shaw's Gardens," were opened to the public in 1859, but its formal opening as a botanical institution took place upon the organization of the

trust, in the fall of 1889. Founded by Henry Shaw, of St. Louis, who gave the original building and planted grounds, and the initial endowment.

Area: City Garden, 75 acres; Arboretum, Gray Summit, Mo. (near St. Louis), 1600 acres.

Directors: William Trelease (1889–1912); George T. Moore (1912–).

Open free, daily except New Year's and Christmas; on weekdays from 8 a.m. to one-half hour after sunset; Sundays from 10 a.m. to sunset. *Source of income:* Endowment, about $5,000,000. Annual Budget: Approximately $150,000. *Library:* Chiefly reference, with a limited circulation. Total number of volumes about 50,000; number of pamphlets nearly 75,000; manuscripts, 332. Number of periodicals regularly received, 1400. *Herbarium:* About 1,050,000 specimens. *Plantations:* In St. Louis, iris, rose, medicinal plant, formal and water gardens. At the arboretum (at Gray Summit), pinetum, native wild flower plantations, azalea-rohdodendron garden, flowering crab, cherry, and apple orchards. *Species under glass:* 6500. *Herbaceous plants out of doors:* 7500.

Publications:

Missouri Botanical Garden Bulletin, established Jan. 1913. Monthly. Subscription $1.00 a year. Not a scientific publication, but "devoted almost exclusively to informing the people of St. Louis and vicinity what can be seen and learned at the Missouri Botanical Garden." Contains the annual report of the Director.

Annals of the Missouri Botanic Garden. Established March, 1934. Quarterly. Subscription $6.00 a volume.

The *Annals* and the *Bulletin* together take the place of the *Annual Report* (1890–1912). *The Twenty-third Annual Report* (1912) marked the close of that publication.

Museum: Henry Shaw Museum, containing relics pertaining to the life of Henry Shaw and the history of the founding of the Garden.

Lecture Courses: Course for amateur gardeners, and an advanced course on gardening and allied subjects. January–April. Lectures on gardening and allied subjects are delivered by members of the staff before various organizations, outside the Garden.

Affiliations: Washington University, St. Louis, Mo. The Director of the Garden is Engelmann, Professor of Botany in the Shaw School of Botany of Washington University.

School for Gardeners: There is a provision for six garden apprenticeships which provides for three years' training in general horticulture, forestry, and other subjects. The students work full time in the Garden under the heads of the various departments.

New Jersey

TRENTON

PACK MEMORIAL ARBORETUM (Washington Crossing State Park)

State Forester, Dept. of Conservation & Development, State House Annex, Trenton, N. J.

Established: May 19, 1932. *Area:* 10 acres.

Direction: N. J. State Board of Conservation & Development.

Serves as a public park. Open free daily. *Source of income:* State appropriations. There is an *Arboretum.* *Plantations:* Geographic and Morphologic.

New York

BROOKLYN (1)

BROOKLYN BOTANIC GARDEN

1000 Washington Avenue

Established: 1910 (Authorized December 10, 1909). *Area:* 50 acres.

Director: C. Stuart Gager (1910–).

Serves as a public park. Open free, daily. *Sources of income:* Private funds and New York City Tax Budget Appropriation. *Endowment:* $1,350,000.

Membership: Seven (7) classes, as follows:

Benefactor (on payment of $100,000 or more)
Patron (on payment of $25,000 or more)
Donor (on payment of $10,000 or more)
Permanent member (on payment of $2,500 or more)
Life member (on payment of $500 or more)
Sustaining member ($25 a year)
Annual member ($10 a year)

Library: Reference. 19,500 volumes and 16,000 pamphlets. Current periodicals received, nearly 1000. *Herbarium:* About 150,000 specimens, including Phanerogams and Cryptogams.

Plantations: Systematic, Ecologic, Horticultural, Special Gardens (Rose Garden, Rock Garden, Japanese Garden, Local Flora, Wall Garden, Water Gardens, Children's Garden, Medicinal Plant Garden, Herb Garden.)

Publications: Ecology, quarterly; *Genetics,* bi-monthly; *Contributions,* irregular; *Memoirs,* irregular; *Record,* quarterly (includes Prospectus, Seed Exchange List, and Annual Report); *Leaflets,* bi-monthly.

Lectures and Classes: Lectures are given to children and adults in addition to courses of instruction. *Study Collections:* The Garden has study collections to loan to schools, and living matter for study is supplied to local schools when requested. *Affiliations:* New York University, Long Island University.

BROOKLYN (2)

Hunt Horticultural and Botanical Garden

(Called also The Brooklyn Hunt Botanical Garden)

Incorporated: April 9, 1855.

Note: Three city blocks east of Fifth Avenue, Brooklyn and between 57th and 60th Streets, and $87,000 were given by Thomas Hunt, William C. Langley, and Henry A. Kent. The movement was started by The Brooklyn Horticultural Society incorporated in April, 1854. The plan was abandoned within one year, but no reason for the failure has apparently been left on record. The site is now completely covered with buildings. The land was deeded back to the original three donors.

BROOKLYN (3)

Parmentier's Garden

Established: October, 1825. *Area:* 23 acres.

Note: The site was "between the Jamaica and Flatbush roads," on the outskirts of what is now the City of Brooklyn. It was near the present Brooklyn Terminus of the Long Island R. R. It is recorded (Records, U. S. Catholic Historical Society, p. 440, December, 1904) by Thomas F. Meehan, that the "black beech

tree" (*Fagus sylvatica* var. *purpurea?*) was first introduced into America through Parmentier's Garden. Here were grown 396 kinds of ornamental and forest trees and ornamental shrubs.

Established by André Parmentier.

BUFFALO (1)

Buffalo Botanic Garden

(South Park Botanic Garden)

Lackawanna, New York

Established: 1894. *Area:* 155 acres.

Directors: John F. Cowell (1894–1915); Patrick W. Scanlon (1915–).

Serves as a public park. Open free, daily, at all hours. *Source of income:* Annual appropriations by the City of Buffalo. *Library:* Reference. 600 volumes, 3000 pamphlets. Number of current periodicals regularly received, 10. *Herbarium:* 100,000 specimens. *Plantations:* Systematic, Arboretum (500 species), Fruticetum (700 species). *Museum:* Open free, daily, from 9 a.m. to 5 p.m. *Lectures* to school children are given both at the Garden and at schools. *Loan collections for the use of schools:* herbarium specimens, dried seeds, economic plant products, photographs. *Study material* supplied occasionally when requested to both public and private schools. *Affiliations:* The first director was professor of forestry in the University of Buffalo.

BUFFALO (2)

Botanic Garden of Buffalo City Hospital

462 Grider Street. Seed List

CORNWALL-ON-THE-HUDSON

The Black Rock Forest

Established: 1927. *Area:* 3137.68 acres.

Director: Henry H. Tryon (1927–).

A private property organized as a forest laboratory for research in problems of fundamental and applied Silviculture and Forest Management, and for the practical demonstration of successful methods. *Source of income:* Expenses are met in part by the owner, Dr. E. G. Stillman, and in part through the sale of forest products. *Open free, daily,* "For public use by anyone who will

treat it properly." *Publications:* Bulletin (established 1930; annually). Black Rock Forest Papers (established 1935); quarterly).

FLUSHING

Linnaean Botanic Garden (Discontinued)

Established: 1737. *Area:* At first 8 acres; later, 80 acres.
Proprietors: Robert Prince (1737–); William Prince (?); William Robert Prince (?–1869).

Note: This garden was primarily a nursery. The name "Linnaean Botanic Garden" was not given it until 1793. The garden, from its beginning to its end, was for 130 years conducted by one family—through five generations. Here, it is said, were planted the first tulips, the first Lombardy poplars, and the first Mahonia in America. This appears to have been the first "botanic garden" on Long Island.

GILBOA

(Fossil Plant Botanic Garden)

The Director, State Museum, Albany, New York

Established: 1927. *Area:* 80 sq. ft.

Gilboa Fossil Trees. This is a roadside exhibit of specimens of fossil tree stumps near the spot where they were taken from the rocks at Gilboa, in the Catskill Mountains, Schoharie County, New York State, U. S. A. The group is just within a fence and can be plainly seen from passing automobiles. A large-lettered label can easily be read from a car standing in the road. The stumps are set in a cement base thick enough to be unaffected by the action of frost. The fossil forests of Gilboa are of Upper Devonian age.

This exhibit was installed by the New York State Museum (Albany, N. Y.) through the cooperation of the New York City Board of Water Supply in the spring of 1927. According to a statement of the Museum, "These Gilboa trees in general must have resembled the tree ferns of the tropics today, and also of the ancient Carboniferous and Upper Devonian Times. They do not, however, belong to this group, but were higher types—seed ferns [Pteridosperms]."

"The greatest interest in these forests is that they are the oldest known to science." (See *Lester Park; Ritchie Park.*)

ITHACA

Cornell University Arboretum

Cornell University

Established: 1934. *Area:* 500 acres.

Directors: Under the direction of an arboretum committee of the faculty.

Serves as a public park. Open free, daily. *Source of income:* The initial planting was done by CCC (Civilian Conservation Corps, of the National Recovery Administration—NRA) men in 1935. The cost of maintenance is met by annual appropriations to Cornell University. *Herbarium and Museum:* As of 1935 no steps had been taken toward the development of a herbarium and museum apart from those already in existence at the University. During 1936 "much planting was done."

LACKAWANNA (SEE BUFFALO (1))

LESTER PARK (NEAR SARATOGA SPRINGS)

Fossil Botanic Garden

The Director, State Museum, Albany, New York

In 1914 the New York State Museum received from Willard Lester, Esq., a deed of gift of about 3 acres of land in the township of Greenfield, two miles west of Saratoga Springs, N. Y. This area includes the widely known "*Cryptozoon Ledge,*" and is set apart as a public park to be preserved and protected by the State because of its paleobotanical interest. A notice of this gift, and a brief geological and paleobotanical description of the area was given by Dr. John M. Clarke, Director of the New York State Museum, in *Science* **40**: 884. 18 D 1914, under the title, "A fossil botanical garden." (See also *Ritchie Park,* p. 339.)

NEW YORK CITY (1)

Elgin Botanic Garden (Discontinued)

Established: 1801, by Dr. David Hosack. *Area:* 20 acres.

This Garden was established "as a repository of native plants, and as subservient to medicine, agriculture, and the arts." The land was purchased by Hosack from "the Corporation of the City of New York," for $4,807.36, and in the first edition of his "Catalog of Plants Contained in the Botanic Garden at Elgin" (New York, 1806), he reports that the greater part of the area was then in cultivation. He states further that "A primary object of attention in this establishment will be to collect and cultivate the native plants of this country, especially such as possess medicinal properties, or are otherwise useful." Also to introduce similar kinds of plants from different parts of the world to ascertain which ones might be successfully naturalized. The plantations were in part systematic illustrating the "natural orders" according to both Linnaeus and Jussieu.

On January 3, 1811 Hosack conveyed the Botanic Garden with its conservatory and all other appurtenances to the State of New York for the sum of $74,268.75. The plants and tools were, in 1810, appraised by a Committee that included the botanist Pursh, as worth $12,635.74½ cents. The Regents of the State placed the Garden in the control of the College of Physicians and Surgeons. When this college became part of Columbia University (1814) the University took over the ownership and management. Subsequently 16 city lots at 48th St. and Fifth Ave. were sold to the Collegiate Dutch Reformed Church for $80,000 and about 1900 the block between 47th and 48th Sts. was sold for about $3,000,000. The Garden became neglected for lack of funds and was gradually given up. The land between 48th and 51st Streets, from Fifth to Sixth Avenue was leased in 1929 to John D. Rockefeller, Jr., at a rental of $3,000,000 a year, and is now the site of Rockefeller Center. Of 513,575 sq. ft. (nearly 12 acres) of the area of the Rockefeller Center, 445,600 sq. ft. were in the area of the Elgin Botanic Garden.

NEW YORK CITY (2)

The New York Botanical Garden

Fordam Branch P. O., New York, N. Y.

Established: 1895 (Chartered, April, 1891). *Area:* 40 acres.

Directors:

1. Nathaniel Lord Britton (1895–1930)
2. Elmer Drew Merrill (1930–October 1, 1935)
3. Marshall Avery Howe (1935–December 24, 1936)
4. Henry Allan Gleason (Acting) (1937–)

Serves as a public park. Open free every day in the year, at all hours. *Sources of income:* Endowment, annual appropriations by the City of Greater New York, private subscriptions, membership dues, sale of publications and photographs.

Membership: Eight (8) classes, as follows:

Benefactor	single contribution	$25,000
Patron	single contribution	5,000
Fellow for Life	single contribution	1,000
Member for Life	single contribution	250
Fellowship Member	annual fee	100
Sustaining Member	annual fee	25
Annual Member	annual fee	10
Garden Club Membership	annual fee for a club	25

Library: Reference. 43,500 volumes and many thousand pamphlets. Current periodicals received: Approximately 1000. *Herbarium:* More than 1,706,000 specimens, distributed approximately as follows: Flowering Plants and Ferns: 1,121,000; Fungi: 252,000; Mosses: 171,000; Hepatics: 55,000; Algae: 77,000; Lichens: 30,000. *Plantations:* Systematic, arboretum, fruticetum, Rose garden, Rock garden.

Publications:

Journal. Established 1900. Monthly. Subscription, $1.00 a year. Editor, Arlow Burdett Stout.

Bulletin. Established 1896. Issued irregularly. Subscription $3.00 a year. Editor ——.

Mycologia. Established 1909. Bi-monthly. Subscription $6.00 a year. ($5.00 to members of the Mycological Society of America.) Editor, Fred J. Seaver.

North American Flora. Established 1907. Planned to be completed in 34 volumes. Royal, 8 vol., each vol. of 4 parts. 75 parts now issued (1935). Subscription $1.50 a part.

Addisonia. Established 1916. Semi-annual. Devoted to colored plates and descriptions. Subscription $10.00 a volume. Editor, Edward J. Alexander.

Brittonia. Established 1931. Issued irregularly. Subscription, $5.00 a volume.

Memoirs of the New York Botanical Garden. Established 1900. Issued irregularly. Subscription to members of the Garden $1.50 a volume; to others $3.00.

Contributions. Established 1897. Reprints from other journals. 25 cents each, $5.00 a volume.

Museum: Open free, daily, from 10 a.m. to 4:30 p.m. *Lectures:* Special lectures are given to school children at the garden, but not at schools. *Study Collections:* There are no study collections to loan to schools, but living material is supplied to teachers in both public and private schools, to a limited amount, occasionally when requested. *Affiliation:* Columbia University.

PORTAGEVILLE

Letchworth Park Arboretum

Established: 1907. *Area:* About 1000 acres.

Occupies a strip of land extending for three miles along both banks of the Genesee River, given to the State of New York in 1907 by William Pryor Letchworth. A museum and library building was erected in 1912–1913.

POUGHKEEPSIE

Dutchess County Botanical Garden

Established: 1920. *Area:* 4 acres.

Director: Edith A. Adelaide Roberts (1920–).

Open free to the public. *Plantations:* Ecological. Popularly known as the "Dutchess County Ecological Laboratory." The majority of the native plants of Dutchess County are grown here in some 28 ecological associations (out of a total of 30 in Dutchess County). *Source of income (in part):* In 1922–1923 the Department of Botany was granted the income from the Elizabeth Drinker Storer Fund for seven years. *Affiliation:* Vassar College (Department of Botany).

RITCHIE PARK (NEAR SARATOGA SPRINGS)

Petrified Gardens

191 Caroline Street, Saratoga Springs, Route 29, three miles west of Saratoga Springs

Established: About 1930. *Area:* 30 acres.

Note: About one-half mile south of Lester Park on the Greenfield road is Ritchie Park, privately owned by Mr. Robert Ritchie, Saratoga, New York. This entire area is all underlain by "Cryptozoon reefs," formed by three different species of this calcareous alga. The display is said to be finer than the ledge in Lester Park. About six acres have been cleared so as to display the fossil remains. "The finest thing of the kind in the world."

Open to the public; admission 35 cents. Guides. A natural ledge, 500 feet long, is being developed as a rock garden. "Our future project includes conservation of the natural beauty of the park, testing plant material for hardiness, and a 'bird haven.'" (See also *Lester Park* and *Gilboa.*)

North Carolina

CHAPEL HILL

ARBORETUM OF THE UNIVERSITY OF NORTH CAROLINA

Established: 1902. *Area:* 5 acres. There is also a greenhouse and propagation ground of about 2 acres at another place on the campus.

Director: W. C. Coker (1902–).

Source of income: University of North Carolina. The Arboretum is administered as part of the Department of Botany of the University. *Library:* That of the University. *Herbarium:* "One of the best in the South." *Medicinal Plant Garden.*

HICKORY

THE HICKORY ARBORETUM

G. F. Ivey, Hickory, North Carolina

Established: 1933. *Area:* 7 acres.

Director: G. F. Ivey (1933–).

Serves as a public park. Open free daily. *Source of income:* Private funds. *Plantations:* Not definitely classified.

Ohio

CINCINNATI (1)

MT. AIRY FOREST ARBORETUM

c/o Board of Park Commissioners, 2005 Gilbert Avenue

Established: 1931. *Area:* About 106 acres.
Director: Under control of Cincinnati Board of Park Commissioners.

The Arboretum is a part of the public park. Open free daily. *Source of income:* General Park appropriations and private donations. *Plantations:* Systematic.

CINCINNATI (INDIAN HILL) (2)

S. M. Rowe Arboretum

R. R. No. 1, Station "M"

Established: 1929. *Area:* 100 acres.

This Arboretum is a private estate. It does not serve as a public park, but is open free at any time to those interested. *Source of income:* Private funds. *Library:* Small. *Fruticetum:* Shrubs not segregated.

CLEVELAND

The Holden Arboretum

The Cleveland Museum of Natural History, 2717 Euclid Avenue

Established: December, 1930. *Area:* 100 acres.
Directors: Under supervision of the Museum.

Source of income: None at present. Future income from memorial fund. There have been a few private gifts. *Library:* 10,000 specimens. *Publication:* "Significance of the Holden Arboretum."

COLUMBUS (1)

Arboretum of Ohio State University

In 1926 a movement was started "for the purpose of establishing an arboretum in connection with Ohio State University." A "Constitution and By-Laws of the Ohio Botanic Garden Society" was adopted.

COLUMBUS (2)

Botanic Garden of Ohio State University

Department of Botany, The University

Director: Edgar N. Transeau.

NEWARK

Dawes Arboretum

Established: June, 1919, by Beman G. Dawes. *Area:* 325 acres.
In Licking County near Newark.

Source of income: Endowment. *Note:* "Outstanding figures of government, industry, military, and sport circles have planted some of the Arboretum's 700 trees, which represent all the varieties that thrive in the temperate zone," including "descendants of such famous and historical trees as the Charter Oak and the Logan Elm."

TOLEDO

The Director, Toledo Zoological Society, Walbridge Park

Note: In the Museum News, April 15, 1936, it is reported that the Toledo Zoological Society has under construction a natural science development, comprising a Museum of Natural and Social Science, and a *Botanic Garden with conservatories.* Our letter of inquiry with questionnaire remains unanswered.

WOOSTER

Wooster Arboretum

Established: 1908. *Area:* 70 acres.
Administered by Ohio Agricultural Experiment Station, Division of Forestry.
Serves as a public park. Open free, daily. *Library.*

Pennsylvania

BETHLEHEM

Arboretum of Lehigh University

Established: About 1916. *Superintendent:* A. Litzenberger.

MARSHALLTON

Marshallton Arboretum (Discontinued)

In 1773 Humphrey Marshall, cousin of John Bartram, began the foundation of an Arboretum in Marshallton (then called Bradford), Penn. (See Philadelphia: Bartram Garden.)

MEDIA

Painters' Arboretum (Discontinued)

Established: About 1825. Discontinued "sometime in the 'seventies." *Area:* About 4 acres.

Location: Middletown Township, Delaware County, Pennsylvania —three miles from Media.

Founders: Jacob and Minshall Painter (brothers).

Note: H. S. Connard (Proc. Delaware County Institute of Science **7**: No. 1. 1–14. May, 1914) stated that as late as 1898 the site of this Garden contained "one of the richest and rarest collections of trees and shrubs in this vicinity." He gives a partial list of them (as of 1898), comprising eighty genera and about 117 species, including the Cutter-dock (*Petasites*), *Sequoia gigantea,* Cedar of Lebanon, and *Gordonia* (*Franklinia*). A description of the ecology of this area is given by T. Chalkley Palmer in The Westonian, Vol. 30, No. 4, Autumn, 1929. In this article Mr. Palmer records the fact that this area, part of a tract of some 800 acres or more, was, in 1929, in the ownership of Mr. John J. Tyler, of Germantown (Philadelphia), a nephew of the Painter brothers. As of 1936 Mr. Gerard Ronon, of Philadelphia, was Trustee of the property. Our questionnaire was not returned.

MERION

Arboretum of the Barnes Foundation

Merion, Montgomery Co., Pennsylvania

Established: 1923. *Area:* 11 acres.

Director: Mrs. A. C. Barnes (1923–).

Admission by request. Source of income: Barnes Foundation. See article by Frank A. Schrepper, The Arboretum of the Barnes Foundation. (*Landscape Architecture* **25**: 21–26. Oct. 1935.)

PHILADELPHIA

Awbury Arboretum

Germantown, Philadelphia

Established: 1918. *Area:* 65 acres.

Directors: Arthur W. Cowell (1919–?); Howard S. Kneedler, Jr. (1935–).

Serves as a public park. Open free, daily, from sunrise to sunset. *Source of income:* Endowment fund and subscriptions. *Fruticetum:* Shrubs not segregated.

Bartram Garden (Discontinued)

Founded 1728 by John Bartram on the banks of the Schuylkill River. The site is now within the city limits of Philadelphia, and is preserved as a historic "monument." It was continued by William Bartram, son of John. Harshberger considers the *Gingko biloba,* planted by John, as the first Gingko to be planted in America since it is larger than the one in Woodland Cemetery (Philadelphia) which Charles S. Sargent considered the oldest. Discontinued about the end of the 18th century. John Bartram, 2nd, erected a building on the site in 1775.

Botanic Garden of the University of Pennsylvania

University of Pennsylvania, Philadelphia

Established: 1892. *Area:* Nearly 4 acres.
Directors: J. M. McFarlane (1895–1920); Rodney H. True (1920–July 1, 1937). Jacob G. Schram (July 1, 1937–).

Open free to the public daily from 8 a.m. to 5 p.m. *Source of income:* Endowment of $55,000, and annual University grant. *Library:* More than 10,000 volumes, 4000 pamphlets (as of 1934). *Herbarium:* More than 100,000 sheets. *Plantations:* Systematic and general. Supplies about 7000 specimens annually to local schools for study.

Darlington's Arboretum (Discontinued)

Established: About 1850. Laid out as part of the public park of Westchester, Pennsylvania, by William Darlington.

Evans's Arboretum (Discontinued)

Established: 1828, near Bryn Mawr, Pennsylvania.

Hemlock Arboretum

Care of C. F. Jenkins, Mt. Airy, Philadelphia, Pa.

Established: 1931. *Area:* 5½ acres.
Director (and owner): C. F. Jenkins.

Does not serve as a public park, but is open free to the public at all times. *Source of income:* Privately endowed. *Library:* Small. *Plantations:* Systematic and geographic. *Publications:* Quarterly Bulletin. (Jan., April, July and Oct.)

Marshall's Garden (Discontinued)

Established: 1773, at West Bradford, Pennsylvania, by Humphry Marshall, a cousin of John Bartram. Some of the trees are still standing (1937) but the garden, as such, has been abandoned. (See Philadelphia: Bartram Garden.)

Morris Arboretum of the University of Pennsylvania

Chestnut Hill, Philadelphia

Established: Oct., 1932. *Area:* 160 acres.
Director: Rodney H. True (1932–).

Does not serve as a public park. Admission free. Hours: 2–5 Wednesdays and Thursdays, 1–5 Saturdays. *Source of income:* Endowment (The Morris Foundation). *Library:* 1500 volumes; 125 pamphlets. *Herbarium:* 10,000 sheets. *Fruticetum:* Shrubs not segregated. *Plantations:* Mainly systematic with attention to soil diversity. *Publications:* Bi-monthly pamphlet planned (1934). Scientific monograph series planned (1934). *Lectures* on horticultural subjects free to the public. *Study material* supplied to schools in limited quantity. *Affiliated* with University of Pennsylvania.

There are a number of graduate fellowships for students in botany working for advanced degrees. A stipend of $1200 accompanies each appointment.

The property comprises two estates: "Compton" (about 90 acres), at Germantown and Hillcrest Avenues, Chestnut Hill (Philadelphia), and "Bloomfield" (70 acres), in Montgomery County, across the City line from "Compton."

Rosicrucian Garden (Discontinued About 1800)

Located on the lower Wissahickon River, previous to the American Revolution (early 18th Century). Contained medicinal herbs used by the Rosicrucian (Red Cross) fraternity.

Witt's Botanic Garden (Discontinued)

Established: 1708, by Christopher Witt at Germantown, now a suburb of Philadelphia.

READING

Reading Botanic Garden

In 1925 plans were initiated for a Botanic Garden to be operated in conjunction with the Reading Museum, Levi W. Menzel, Director. The Museum is under the jurisdiction of the Board of Education.

SELINGSGROVE

Botanic Garden of Susquehanna University

Announcement was made by letter of Feb. 11, 1921, that a Botanic Garden was about to be established at Susquehanna University.

SWARTHMORE

Arthur Hoyt Scott Horticultural Foundation

Swarthmore College

Established: 1929. *Area:* 250 acres.
Director: John C. Wister (1930–).

Serves as a public park. Open free at all times. *Source of income:* Endowment, Arthur Hoyt Scott Horticultural Foundation. *Library:* The botanical and horticultural books in the College Library. *Herbarium:* That of the Botanical Department of the College. Fruticetum, but shrubs not segregated. *Plantations:* Systematic and geographic. *Publications:* A preliminary report and occasional small pamphlets about flowering plants. *Affiliation:* The Garden is affiliated with Swarthmore College, Swarthmore, Pa.

TYLER ARBORETUM (PAINTERS' ARBORETUM)

(See Media)

WESTTOWN

Westtown School Arboretum

Westtown

Established: 1906. *Area:* 20 acres.

Directors: Alfred Z. Haines (1906–1909); Albert J. Bailey, Jr. (1921–).

Open free daily. *Source of income:* Donations. *Library:* The School library consists of about 200 volumes on botany. *Herbarium:* Approximately 3000 specimens. *The arboretum* is restricted to "arborescent natural species." There is no fruticetum. *Plantations:* Systematic. Shrubs and horticultural varieties of trees, while present in some numbers, are not the main interest of the project. This on account of limited area and funds. Conifers about 100 (including 25 species of *Pinus*). Deciduous trees, about 250. *Publications:* None. There is no scientific nor special educational program beyond the elementary botany courses of the Westtown (preparatory) School.

South Carolina

CHARLESTON

Thomas Walter's Botanical Garden (Discontinued)

This Garden was established by Thomas Walter in the second half of the 18th century on the banks of the Santee River, north of Charleston, South Carolina, U. S. A. Upon his death the Garden was abandoned, and nothing remains now except Walter's grave, marked by a broken marble slab. Walter was the author of *Flora Caroliniana* (1788). Dr. John K. Small refers to this publication as "the first manual of the plants of a more or less definite geographic area." (Small, John Kunkel. Manual of the Southeastern Flora, ix. 1933; *Torreya* **36**: 166–167. 1935.)

Tennessee

KNOXVILLE

A. F. Sanford Arboretum

P. O. Box 197

Established: 1930. *Area:* 20 acres.

Open free daily. *Source of income:* Maintained by owner personally. *Plantations:* Systematic. *Publications:* Occasional catalogues and planting list. *Affiliations:* University of Tennessee botanical department cooperates unofficially.

Texas

AUSTIN

Botanic Garden of the University

A tract of land of 500 acres on the Colorado River near Austin belonging to the University was set aside to be developed in whole or part, as a botanic garden. (*Fide* personal letter.)

FORT WORTH

Fort Worth Botanic Garden

c/o Fort Worth Park Department, Rotary Park

Established: 1933. *Area:* 35 acres.
Directors: Board of Park Commissioners.

Open free at all times. *Source of income:* The City refunds taxes on Park properties for up-keep. *Plantations* include Arboretum, Water Gardens, Rose Garden, Arid and Native Wild Flower Gardens, and Nature Trails. *Library:* In the making (about 500 volumes and pamphlets in 1935). *Herbarium:* 8500 specimens mounted and classified. A large part of the Garden, just a little more than one year old (a Government Project), was built by relief labor. *Special lectures* are given to school children at the Garden. *Living material* is supplied to local schools for study. The Garden operates the Fort Worth Garden Center in the Horticultural Building. *Affiliation:* Fort Worth Public School; Fort Worth Garden Club.

HOUSTON

Houston Botanical Garden

Established: 1925. *Area:* 15 acres.
Administered by City Park Department. Open free, daily. *Herbarium:* About 3000 sheets.

Washington

CARSON

WIND RIVER ARBORETUM

424 U. S. Court House, Portland, Oregon

Established: 1912. *Area:* Nearly 9 acres.
Director (Acting): Donald N. Matthews (1936).

Administered by U. S. Department of Agriculture, Forest Service, Project of Pacific Northwest Experiment Station, ten miles northwest of Carson in Columbia National Forest. *Plantations:* About 1700 trees, nearly 150 species. *Publication:* Reports of Progress (mimeographed). Located across Columbia River about 40 miles from Portland, Oregon.

SEATTLE (1)

MEDICINAL PLANT GARDEN

College of Pharmacy, University of Washington

Seed List.

SEATTLE (2)

WASHINGTON ARBORETUM AND BOTANICAL GARDEN

Department of Forestry, University of Washington
Established: December 16, 1935. *Area:* 260 acres.
Director: Hugo Winkenwerder (1935–).

Serves as a public park. In 1935 the area, Washington Park, adjacent to the Campus of the State University of Washington, was set aside as a botanic garden and arboretum by the Seattle Park Board. It is to be "a state-wide institution under perpetual supervision of the University of Washington.

Source of income: On December 16, 1935, a WPA (U. S. Works Progress Administration) Project, jointly sponsored by the University of Washington and the Park Department of the City of Seattle, was put into operation. This provides for $166,629 of Federal Funds, and $129,660 additional in services and materials contributed by the University and the City. This project was closed July 8, 1936, because the funds allotted were exhausted..

The Arboretum Foundation, "a non-profit corporation," has been formed "to assist in and foster the development of Washington's Arboretum and Botanical Garden." Membership in the Foundation is in five classes, as follows:

Associate	Annual dues	$ 2.00
Regular	" "	5.00
Active	" "	10.00
Sustaining	" "	25.00
Patron	One payment of $500.00 or more	

Plantatins: Systematic; Ecological; Special.
Publications: The Arboretum Bulletin. Vol. I, No. 1, December, 1936. Seed List.

West Virginia

WHEELING

Arboretum

In the *Museum News* for May 15, 1928 it was stated that the first Arboretum in West Virginia was about to be established in Wheeling with an area of about 70 acres. Address given "Manager, Waddington Farm, Wheeling." No reply to our questionnaire.

Wisconsin

MADISON (1)

Wisconsin Arboretum and Wild Life Refuge

Arboretum Committee, Biology Building

Established: April, 1932. *Area:* 500 acres.
Director: E. M. Gilbert, Chairman of Arboretum Committee (1932–).

Serves as a public park only in very small part. Admission free. *Source of income:* Gifts. Also appropriations from the State. *Library:* University Library. *Herbarium:* University Herbarium (approximately 120,000 specimens). *Plantations:* Systematic, geographic, ecologic. Some acreage has been set aside for Family, Genus, and Species groupings, but most of the plantings will be in the nature of natural groupings, such as American Larch Association, Wisconsin Oak Woods, Juniper Association,

Open Prairie (90 acres), Marsh, etc. *Lectures* are given to school children at the Garden. *Affiliations:* With the University of Wisconsin. *Note:* In the development of the Arboretum natural surfaces are being left undisturbed, except in some places where it is absolutely necessary to change them for service or safety. An item in *Science* for March 5, 1937, p. 236, states that the Alumni Research Foundation has allotted $8000 which will provide for the continuation of the work now being done by Professor Aldo Leopold on game management and land-waste problems in connection with the university arboretum.

MADISON (2)

Wisconsin Pharmaceutical Garden

Area: 38 acres.
Direction: Wisconsin Pharmaceutical Experiment Station.

RIPON

Botanic Garden of Ripon College

Plans for the establishment of this Garden were announced in 1928. Dr. James F. Groves, of the Botany Dept. of the College was chosen Director. Initial planting in the spring of 1928.

Uruguay

MONTEVIDEO

Jardin Botánico del Prado

Avenida Reyes 1155 y 1179

Director: W. G. Herter.
This Garden is under the Municipal Park Department.

Venezuela

CARACAS

Jardin Botánico

Windward Islands

GRENADA

Botanic Gardens, Grenada

St. George's, Grenada, Windward Islands

Established: 1866. *Area:* 26 acres (including areas now being annexed to the Botanic Gardens).
Directors: (Present title, Superintendent of Agriculture)

1. W. R. Elliott (1886–1889)
2. E. M. Murray (1889)
3. G. Whitfield Smith (1890–1894)
4. W. E. Broadway (1894–1904)
5. R. D. Anstead (1904–1909)
6. Gilbert Auchinleck (1909–1914)
7. J. C. Moore (1914–1920)
8. R. O. Williams (1920–1921)
9. W. O'Brien Donovan (1921–1929)
10. K. T. Rae (1929–1931)
11. W. O'Brien Donovan (1931–)

Serves as a public park. Open free to the public daily, from 6 a.m. to 6 p.m. *Source of income:* Annual appropriations by the Island Government. Appropriation, 1934: £600. *Library:* Reference, a section of the general library of the Department of Agriculture. 420 volumes. *Note:* "Until 1906 this garden was conducted by a Curator from Kew, but that year an Agricultural Department was created, with a qualified and experienced agriculturist at the head. At present the gardens are hardly botanic in a scientific sense, but are chiefly ornamental and used for the propagation of economic plants. The Department uses spare corners for minor economic experiments."

ST. LUCIA

Botanic Gardens, Castries

Established: 1887. *Area:* 7.5 acres.
Directors (Agricultural Superintendent):

1. John Gray (1887–1895)
2. John Chisnall Moore (1895–1914)
3. Archibald Joseph Brooks (1914–1922)
4. Ernest Alfred Walters (1922–)

Serves as a public park. Open free, daily, 6 a.m. to sunset. *Source of income:* Annual grants by the national government. *Library:* Reference. About 403 volumes. *Plantations:* Economic only. Small decorative section at Botanic Gardens. *Publications:* Annual Report, Pamphlets. *Lectures:* Occasional lectures to

school teachers. *Note:* "The staff of the agricultural department directs agricultural training in the primary schools, gives occasional lectures to school teachers, visits and advises planters and peasants on practical agricultural matters, conducts experiments in cultural methods on estates and at the experiment station, and raises and distributes at nominal charges such economic plants as are required for estate planting, besides introducing and trying new plants." A few native pupils are trained at the department stations in practical agri-horticulture.

Yugoslavia—See Jugoslavia

Addendum

Georgia

LIBERTY COUNTY

BOTANIC GARDEN OF LOUIS LECONTE (DISCONTINUED)

Established: About 1810 (?).

Note: "Years ago Georgia could boast several small botanic gardens. Mr. Louis LeConte had a delightful small botanic garden about his home in Liberty County."

MAXEY

LINDSEY PHYSIC GARDEN (DISCONTINUED)

Established: About 1810 (?).

Note: "Coeval with the LeConte garden [in Liberty County, Georgia] Dr. Lindsey Durham, of Maxey, Ga., maintained a physic garden on his plantation and from this garden procured a large part of the materia medica for his practice." (*Garden Gateways.* Pub. by Garden Club of Georgia, Atlanta. 4: 1. Sept. 1917. Citation for this and the above quotation.)

Erratum

Page 316, eighth line under center heading LISLE should read:

C. E. Godshalk (1922–).

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GENERAL INFORMATION

Membership.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, N. Y.* Telephone, Prospect 9-6173.

The Botanic Garden is open free to the public daily from 8 a.m. until dusk; on Sundays and Holidays it is open at 10 a.m.

Entrances.—On Flatbush Avenue, near Empire Boulevard and near Mt. Prospect Reservoir; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Crown Street.

To Assist Members and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden*; to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one day in advance. No parties of less than six adults will be conducted.

To Reach the Garden take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, or Tompkins Avenue trolley to Washington Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street or Vanderbilt Avenue trolley to Prospect Park Plaza and Union Street. By Automobile from points on Long Island take Eastern Parkway west and turn left at Washington Avenue; from Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway, turn left following Parkway to Washington Avenue; then turn right.

BROOKLYN BOTANIC GARDEN
PUBLICATIONS

RECORD. Established, January, 1912. An administrative periodical issued quarterly (1912–1928); bimonthly (1929–1932); quarterly (1933–). Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, announcements of courses of instruction, seed list, guides, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden. To others $1.00 a year. Circulates in 59 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Circulates in 47 countries.

Volume I. *Dedication Papers:* comprising 33 scientific papers presented at the dedication of the laboratory building and plant houses, April 19–21, 1917. 521 pages. Price $3.50, plus postage.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk: A study of grassland and forest. By Norman Taylor, June 11, 1923. 108 pages. Price $1.00, plus postage.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor, June 10, 1927. 151 pages. Price $1.60.

CONTRIBUTIONS. Established, April 1, 1911. Papers originally published in periodicals, reissued as "separates" without change of paging, and numbered consecutively. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume. Circulates in 34 countries.

No. 73. Studies of the root nodule organisms of certain wild legumes. 19 pages. 1936.

No. 74. The effects of radium rays on plants: Résumé of the more important papers from 1901 to 1932. 27 pages. 1936.

No. 75. Inheritance of resistance to the loose and covered kernel smuts of Sorghum: I. Dwarf Yellow Milo hybrids. 20 pages. 1937.

No. 76. Inheritance of resistance to the loose and covered kernel smuts of Sorghum: II. Feterita hybrids. 23 pages. 1937.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. The purpose of the *Leaflets* is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries. Temporarily discontinued, 1936–37.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication. Issued as numbers of the RECORD; see above.

Guide No. 5. The Rock Garden. 28 illustrations. Price, 35 cents. By mail, 40 cents.

Guide No. 6. Japanese potted trees (Hachinoki). 11 illustrations. Price, 35 cents. By mail, 40 cents.

Guide No. 7. The story of our boulders: Glacial geology of the Brooklyn Botanic Garden. 22 illustrations. Price, 35 cents. By mail, 40 cents.

Guide No. 8. The story of fossil plants. 8 illustrations. Price, 35 cents. By mail, 40 cents.

SEED LIST. (*Delectus Seminum*) Established, December, 1914. Since 1925 issued each year in the January number of the RECORD. Circulation includes 160 botanic gardens and institutions located in 40 countries.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $4.00 a year. Circulates in 48 countries.

GENETICS. Established, January, 1916. Bimonthly. Subscription, $6.00 a year. Circulates in 37 countries.

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXVI OCTOBER, 1937 NO. 4

PROSPECTUS

OF COURSES, LECTURES, AND OTHER EDUCATIONAL
ADVANTAGES OFFERED TO MEMBERS AND TO
THE GENERAL PUBLIC

1937-1938

BROOKLYN BOTANIC GARDEN
LIBRARY
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* On leave of absence, October 1, 1937, to October 1, 1938.

INFORMATION CONCERNING MEMBERSHIP

The Brooklyn Institute of Arts and Sciences is organized in three main departments: 1. The Department of Education. 2. The Museums. 3. The Botanic Garden.

Any of the following seven classes of membership may be taken out through the Botanic Garden:

1.	Annual member	$ 10
2.	Sustaining member	25
3.	Life member	500
4.	Permanent member	2,500
5.	Donor	10,000
6.	Patron	25,000
7.	Benefactor	100,000

Sustaining members are annual members with full privileges in Departments one to three. Membership in classes two to seven carries full privileges in Departments one to three.

In addition to opportunities afforded to members of the Botanic Garden for public service through cooperating in its development, and helping to further its aims to advance and diffuse a knowledge and love of plants, to help preserve our native wild flowers, and to afford additional and much needed educational advantages in Brooklyn and Greater New York, members may also enjoy the privileges indicated on the following page.

Further information concerning membership may be had by addressing The Director, Brooklyn Botanic Garden, Brooklyn, N. Y., or by personal conference by appointment. Telephone, Prospect 9–6173.

PRIVILEGES OF MEMBERSHIP

1. Free admission to the buildings and grounds at all times.
2. Cards of admission for self and friends to all exhibitions and openings preceding the admission of the general public, and to receptions.
3. Services of docent (by appointment), for self and party (of not less than six), when visiting the Garden.
4. Admission of member and one guest to field trips and other scientific meetings under Garden auspices, at the Garden or elsewhere.
5. Free tuition in most courses of instruction; in other courses a liberal discount from the fee charged to non-members.
6. Invitations for self and friends to spring and fall "Flower Days," and to the Annual Spring Inspection.
7. Copies of Garden publications, as follows:
   a. RECORD (including the ANNUAL REPORT).
   b. GUIDES (to the Plantations and Collections).
   c. LEAFLETS (of popular information).
   d. CONTRIBUTIONS (on request. Technical papers).
8. Announcement Cards (Post Card Bulletins) concerning plants in flower and other items of interest.
9. Privileges of the Library and of the Herbarium.
10. Expert advice on the choice and care of ornamental trees, shrubs, and herbaceous plants, indoors and out; on planting the home grounds; the care of lawns; and the treatment of plants affected by insect and fungous pests.
11. Determination of botanical specimens.
12. Participation in the periodical distribution of surplus plant material and seeds, in accordance with special announcements sent to members from time to time.
13. Membership privileges in other botanic gardens and museums outside of Greater New York, when visiting other cities, and on presentation of membership card in Brooklyn Botanic Garden. (See the following page.)

OUT–OF–TOWN MEMBERSHIP PRIVILEGES

In accordance with a cooperative arrangement with a number of other institutions and organizations, Brooklyn Botanic Garden members, when visiting other cities, may, on presentation of their Botanic Garden membership card at the office of the cooperating museum or organization, be accorded, without charge, the same privileges as are enjoyed by the members of that institution, including admission to exhibits and lectures, and invitation to social events. This does not include being enrolled on the mailing list for publications, and does not include free admission to the Philadelphia and Boston spring Flower Shows.

In reciprocation, the members of the cooperating units, when visiting the Metropolitan district of Greater New York, will be accorded full membership privileges at the Brooklyn Botanic Garden.

The cooperating units are as follows:

Academy of Natural Sciences, Philadelphia, Pa.
Berkshire Museum, Springfield, Mass.
Boston Society of Natural History, Boston, Mass.
Buffalo Museum of Science, Buffalo, N. Y.
California Academy of Sciences, San Francisco.
Carnegie Museum, Pittsburgh, Pa.
Charleston Museum, Charleston, S. C.
Everhart Museum of Natural History, Science and Art, Scranton, Pa.
Fairbanks Museum of Natural Science, St. Johnsbury, Vt.
Field Museum of Natural History, Chicago, Ill.
Los Angeles Museum, Los Angeles, Calif.
Massachusetts Horticultural Society, Boston, Mass.
Missouri Botanical Garden, St. Louis, Mo.
Newark Museum, Newark, N. J.
New York State Museum, Albany, N. Y.
Peabody Museum of Archaeology and Ethnology, Cambridge, Mass.
Pennsylvania Horticultural Society, Philadelphia, Pa.
Philadelphia Commercial Museum, Philadelphia, Pa.
Southwest Museum, Los Angeles, California.

REGULATIONS CONCERNING PHOTOGRAPHING, PAINTING, AND SKETCHING

1. No permit is required for photographing with a hand camera, or for sketching or painting without an easel on the Grounds or in the Conservatories.

2. Sketching and painting with an easel and the use of a tripod camera are not allowed in the Japanese Garden, the Rose Garden, the Local Flora Section (Native Wild Flower Garden), nor the Conservatories at any time without a permit. No permits are given for use after 12 o'clock noon on Sundays and holidays.

3. Artists, and the public in general, may not bring into the Botanic Garden chairs, stools, or anything to sit in or on.

4. Holders of permits must not set up tripod cameras nor easels in such a way as to involve injury to living plants or lawns, nor to cause an obstruction to traffic on congested paths or walks.

5. Application for permits should be made at the office of the Director, Laboratory Building, Room 301, or by mail (1000 Washington Avenue), or by telephone (PRospect 9–6173).

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXVI OCTOBER, 1937 NO. 4

COURSES OF INSTRUCTION

The Brooklyn Botanic Garden offers courses of instruction in botany, gardening, horticulture, and nature study.

A. For members and the general public ("A" courses, p. 356)
B. For teachers ("B" courses, p. 360)
C. For children ("C" courses, p. 363)
D. Other courses of a special nature ("D" courses, p. 364)
E. Research courses ("E" courses, p. 364)

Any course may be withdrawn when less than ten persons apply for registration and no course will be given when less than six apply. Since registration in many of the courses is restricted to a fixed number on account of the limited space available in the greenhouses, and for other reasons, those desiring to attend are urged to send in their application for enrollment, with entrance fee, to the Secretary, Brooklyn Botanic Garden, several days in advance of the first exercise. This avoids delay at the beginning of the first exercise, ensures a place in the course, and enables the instructor to provide adequate material for the class.

Enrollment.—Persons are requested not to register in any course unless they are reasonably confident that they can attend the sessions of the class regularly and throughout. This is especially important where the number to be enrolled is limited. To register and not attend may deprive someone else of the privilege of attending. With the exceptions noted, no registrations will be accepted for separate class exercises.

Equipment available for the courses:

Three *classrooms,* two *laboratory rooms,* and three *Instructional Greenhouses;* the *Children's Garden* occupying about ¾ of an acre

and divided into 150 plots for instruction in gardening; at the north end of the *Children's Garden,* the *Children's Building,* for conferences, and for the storage of tools, seeds, special collections, etc.; the *auditorium,* on the ground floor, capable of seating 570 persons, and equipped with a motion-picture machine and stereopticon, and electric current, gas, and running water for experiments connected with lectures.

In addition to these accommodations, the dried plant specimens in the herbarium, the living plants in the conservatories and plantations, and the various types of gardens, are readily accessible; while the main library and children's library which contain a comprehensive collection of publications on every phase of gardening and plant life, may be consulted freely at any time.

A. Courses for Members and the General Public

Although the following courses are designed especially for Members of the Botanic Garden, they are open (unless otherwise specified) to any one who has a general interest in plants. Teachers are welcome. Starred courses (*) are open also for credit to students of Long Island University, and are described in the current Long Island University catalog. In harmony with an agreement entered into in the spring of 1935, the Botanic Garden, upon recommendation of the Chairman of the Biology Department of Long Island University, offers a course scholarship to one student of the University.

Unless otherwise specified, all "A" courses are *free to members,*† but the individual class exercises are open only to those who register for the entire course. Of others a fee is required, as indicated. In courses where plants are raised, these become the property of the class members.

Fall Courses

A1. Plants in the Home: How to Grow Them.—Five talks with demonstrations. This course deals with the principles to be followed in raising plants. Practice in potting, mixing soils, making cuttings, etc. The members of the class have the privilege of

† For information concerning membership in the Brooklyn Botanic Garden consult pages i–iii.

keeping the plants they have raised. *On account of restricted space in the greenhouse, this class must be limited to 40. Registration according to the order of application. Fee to non-members, $6 (including laboratory fee); to members, $1 laboratory fee. Wednesdays, 11 a.m., November 3 to December 1.*

Mr. Free.

***A5. Trees and Shrubs of Greater New York: Fall Course.**—Ten outdoor lessons in the parks and woodlands of Greater New York on the characteristics of our common trees and shrubs, both native and cultivated, emphasizing their distinguishing features in the winter condition. *Fee, $5. Saturdays, 2:30 p.m., October 2 to December 11. (Omitting November 27.)* The first session will be held at the Brooklyn Botanic Garden.

Dr. Graves and Miss Vilkomerson.

A10. Evergreens.—Eight outdoor lessons: American pines; Old World pines; cedar and hemlock; spruce and fir; yew, cryptomeria, and umbrella pine; cypress family; broad-leaved evergreens. *Fee, $4. Wednesdays, 10:45 to 12:00 noon, September 29 to November 17.*

Dr. Gundersen.

A13. Wild Flowers and Ferns of the New York Region.—Six sessions. Field identification of the common plants of woods and roadsides, including identification of seeds and fruits. *Fee, $3. Saturdays, 2:30 p.m., September 18 to October 23.*

Miss Rusk.

A14. Flower Arrangement.—A course of five lectures and demonstrations. The selection and use of plant material and containers, the principles of color and design in flower arrangement, the various types of period arrangements, and table settings for formal and informal occasions. The last session will consist of a criticism of arrangements made by members of the class. Flowers will be supplied for class use. *Fee to non-members, $4; to members, $2. Wednesdays, 4 p.m., October 6 to November 3.*

Mrs. Merrill.

A24. Beginning Course in Fall Greenhouse Work.—Five sessions. Lifting flowering plants from garden, potting up, and cutting back for winter flowering; discussion of artificial and natural methods of plant propagation; making cuttings; lecture on bulb culture; types; planting tulips, hyacinths, narcissus; demon-

stration of other forms of plant propagation; potting up rooted cuttings; potting on a house plant; planting calla lilies and Easter lilies. Class limited to 40 members. *Fee to non-members, $8; to members, $3.50 laboratory fee. Wednesdays, 10:30a.m., October 13 to November 10.* Miss Shaw and Miss Dorward.

***A31. Ornamental Shrubs.**—Eight sessions, which are held outdoors in the Brooklyn Botanic Garden, for the purpose of becoming acquainted with the common species and varieties of cultivated shrubs. Fall flowers and fruits of ornamental shrubs and small trees, also evergreen shrubs, are studied. This is a continuation of the spring course. *Fee, $5. Wednesdays, 4:00–5:15 p.m., Sept. 22 to Nov. 10.* Mr. Doney.

A40. Botany in Your Garden.—Eight lectures and discussions on fundamental processes in plant life as applied to gardening and horticulture. Designed especially for those interested in amateur gardening. *Fee, $4. Tuesdays, 11 a.m., October 26 to December 14.* Dr. Svenson.

A41. Planning and Planting the Small Place.—A course of five illustrated talks for those who have small grounds and gardens and wish to plan them to the best advantage for beauty and use. Both town and country plots will be considered with detailed discussion of landscaping and planting problems. *Wednesdays at 11:00, January 12 to February 9. Fee to members $4, non-members $6.* Miss Helen Swift Jones, Member American Society of Landscape Architects, Guest Speaker, and Mr. Montague Free.

Spring Courses

***A9. Trees and Shrubs of Greater New York.**—Ten outdoor lessons in the parks and woodlands of Greater New York. Similar to A5, except that the different species are studied in their spring and summer conditions. *Fee, $5. Saturdays, 2:30 p.m., April 16 to June 18.* Dr. Graves and Miss Vilkomerson.

A11. Wild Flowers and Ferns of the New York Region.—Six sessions, in the Brooklyn Botanic Garden and in the woodlands near the City, for field identification of flowers and ferns of spring and early summer. *Fee, $3. Saturdays, 2:30 p.m., April 30 to June 4.* Miss Rusk.

A20. Garden Plants and Flowers.—A course of lectures, illustrated with lantern slides and living plants, with accompanying tours in the Botanic Garden to see the plants or flowers under discussion. To derive the most benefit from the course, one should have a knowledge of the elements of gardening equivalent to that presented in Courses A1 or A25. The following dates have been chosen to accord with the time when the particular plant group is at its best in the Garden.

Ornamental Trees	May 4	Iris	May 25
Rock Garden Plants	May 11	Ornamental Shrubs	June 1
Lilacs	May 18	Roses	June 8

A limited number of bearded iris plants will be available for distribution to those taking the course. *Fee, $5; single exercises, $1. Wednesdays in May and June, 11:00 a.m. to 12:30 p.m.*

Mr. Free, Dr. Gundersen, Dr. Reed, Mr. Doney.

A25. Fundamentals of Gardening.—A course in first principles, for those who desire to carry on practical work in their own gardens. The lessons are as follows: planting seed in the greenhouse; pricking out seedlings in the greenhouse; the garden soil; outdoor lesson. *Class limited to 60 persons. Fee to non-members $7* (including laboratory fee); *to members, $2 laboratory fee. Wednesdays, 10:30 a.m., March 2 to April 6, omitting March 16.*

Miss Shaw and Miss Dorward.

A26. Advanced Spring Garden Work. (*For those who have taken A25.*)—Lessons include the sowing of seeds of perennials, potting on and staking fall-sown annuals; talk on herbaceous borders, art lesson—making a workable plan of an herbaceous border; sowing seeds of slower growing annuals and biennials; talk on pruning and general care of flowering shrubs; pricking out perennials; talk on care of the lawn; pricking out seedlings. An extra session may be necessary to finish pricking. *Class limited to 40 persons. Fee to non-members, $8; to members, $3.50 laboratory fee. Fridays, 10:30 a.m., February 18 to March 25.*

Miss Dorward.

***A30. Ornamental Shrubs: Spring Course.**—Ten outdoor meetings on the grounds of the Botanic Garden. The principal flowering shrubs and small trees are considered at their times of

flowering, emphasis being placed on their uses in landscape work, their cultivation, and distinguishing characters. *Fee, $5. Wednesdays, 11:00 a.m., April 13 to June 15.* Mr. Doney.

A32. Families of Flowering Plants.—Ten outdoor sessions in the Botanic Garden. This course takes up chiefly the structure of flowers and their possible lines of evolution; and the characteristics of important families of flowering plants. (*Not offered in 1938.*) Dr. Gundersen.

A37. Lilacs in Flower.—Five outdoor lessons in the Garden where the unusually comprehensive collection affords opportunity for the study of about fifteen species and a large number of varieties of lilacs. In the last lesson, culture and propagation are studied. Cuttings, which become the property of those taking the course, are prepared for rooting. *Fee, $2.50. Four Wednesdays and one Monday, 10:45 to 12:00 noon, May 4, 11, 16, 18, and June 8.* Dr. Gundersen and Mr. Free.

A38. Plant-Animal Links in the Chain of Life.—Three illustrated lectures on the divergent but interdependent evolution of the two great lines of life: (1) Water plants and water animals. (2) Land plants and cold-blooded animals. (3) Flowering plants and warm-blooded animals. *No fee. Wednesdays, 4 p.m., March 9, 16 and 23.* Dr. Gundersen.

A39. Herbaceous Plants.—Ten outdoor lessons in the Garden, to study the characteristics of the principal ornamental perennials and annuals as they come into flower. These include the Pink, Buttercup, Poppy, Mustard, Saxifrage, Rose, Pea, Primrose, Mint, Figwort, Composite, Lily, Amaryllis, and other plant families. *Fee, $5. Wednesdays, 4–5:15 p.m., April 13 to June 15.* Dr. Gundersen.

B. Courses for Teachers

These courses have been accepted by the Board of Education of New York City for "in-service credit," one credit being granted for each 15 hours (with the exception of "B8, Plant Culture"). Through an agreement with Long Island University, undergraduate credit for certain courses will be allowed toward fulfilling the requirements for a university degree, provided the admission requirements at the University and the laboratory requirements have

been fulfilled. Such courses are starred (*). By special arrangement with the institution concerned, these credits have also been used as undergraduate credits in other colleges and universities. Nature materials used in the courses, and plants raised become the property of the student.

Members of the Garden are entitled to a 50 per cent. discount from the regular fee for all "B" courses; from other persons the indicated fee is required. Long Island University students desirous of electing any of these or of the "A" courses should notify Dean Tristram W. Metcalfe or Dr. Ralph H. Cheney, who will give the candidate a card entitling him to admission to the course. The student should present this card at the beginning of the first session of the course.

B1. General Botany.—A two-year course of thirty two-hour periods (class and laboratory combined) each year. One year (A) is spent on the structure and functions of the higher plants. The other year (B) deals with the structure, life histories, and relationships of the lower groups: bacteria, algae, fungi, lichens, mosses, and ferns. Four credits each year. Either half of the course may be taken first. In 1937–38, B will be given. *Fee, $10 each year. Wednesdays, 4–6 p.m., beginning September 22.* Miss Rusk.

B2 (a). Economic Plants in their Relation to Geography.—A thirty-hour course in fifteen two-hour sessions, designed primarily for teachers of geography and nature study. Lessons will be given on the more important food plants of the world, and those used for clothing, shelter, and other needs of mankind. When possible, illustrative material will be given to members of the class. During the fall of 1937, this course will be offered in place of Fall Nature Study. Two credits. *Fee, $10. Tuesdays, 4–6 p.m., beginning September 28.* Miss Hammond.

B2 (b). Spring Nature Study.—A thirty-hour course in fifteen two-hour sessions. This course is based on the New York City Syllabus in Nature Study. Miss Farida Wiley, of the American Museum of Natural History, will conduct a field lesson on bird study on a date to be announced. Two credits. *Fee, $10. Tuesdays, 4–6 p m., beginning February 8.* Miss Hammond.

B3. Elements of Horticulture.—Thirty sessions. For teachers only. Lessons in potting and general care of house plants; methods of plant propagation, including the planting of bulbs; making cuttings (soft wood, and leaf); sowing seeds; preparing for the outdoor garden. Most of this work is carried on in the greenhouses. Emphasis will be laid on problems of a practical nature. Two credits. *Fee, $10. Wednesdays, 4 p.m., beginning September 29.* Miss Shaw and Miss Dorward.

***B13–14. Trees and Shrubs.**—Twenty trips in the parks and woodlands of Greater New York, to gain a ready acquaintance with the trees and shrubs of the eastern United States. 2 credits. *Fee, $10. Saturdays, 2:30 p.m., Oct. 2 to Dec. 11 (omitting Nov. 27); and April 16 to June 18, 1938.*

Dr. Graves and Miss Vilkomerson.

B7. Greenhouse Work.—Thirty sessions. For teachers only. A continuation of Elements of Horticulture and open to students who have taken that course. Further study of plant propagation methods; arrangement of plants in hanging baskets, window boxes, dishes, etc.; special culture of certain house plants and winter-flowering greenhouse plants. Two credits. *Fee, $10. Tuesdays, 4 p.m., beginning October 5.* Miss Dorward.

B8. Plant Culture.—A course of twenty weeks duration for those who have completed Elements of Horticulture and Greenhouse Work. No Board of Education credits are given for this course. (a). Section A is for those people who have already taken B8. (b). Section B is for students who have never taken B8, and consists of a series of lectures on plant operations in the outdoor garden, as well as greenhouse work. *Fee, $10. Thursdays, 4 p.m., beginning October 14.*

Miss Shaw and Miss Dorward.

***B10. Flowering Plants: Field and Laboratory Study.**—Thirty sessions. The object of this course is to become acquainted with species of wild flowering plants, including weeds. Field and laboratory work are distributed according to the weather, the season, and the needs of the class. The field work is done in the Brooklyn Botanic Garden. The laboratory work consists of comparing similar plants and learning how to distinguish them; pressing, drying, and mounting plants to serve as permanent specimens.

Four credits. *Fee, $10. Thursdays, 4–6 p.m., beginning September 23.* Miss Rusk.

B17. Genetics.—An introductory course in heredity and variation, including discussion of Mendelian principles, the physical basis of heredity, sex linkage, factor linkage, factor interaction, and quantitative inheritance. Laboratory work on plant material and *Drosophila.* Prerequisite: an elementary course in botany. (*Not given in 1937–38.*) Miss Rusk.

C. Children's Courses

More than thirty separate courses are given Saturday mornings for boys and girls from eight to nineteen years old in the spring, fall, and winter.

The children are grouped according to age and experience. For example, under I (below), twelve separate courses are given; under II, four separate courses; under III, fourteen. Under IV, the Outdoor Garden, 200 children are working from late April to mid-September. This does not represent one course, but many courses combined under one heading, "The Outdoor Garden."

Miss Shaw and Assistants.

I. The Fall Course takes up nature study on the grounds; plant propagation in the greenhouses, using stem and leaf cuttings; bulbs and corms; making of terrariums and dish gardens. Enrollment limited to 175 children. *Fee, ten cents. Saturday mornings, 9–11:15, October 16 to December 18.*

II. Winter Course.—Children who have shown unusual ability are chosen from the fall group for early winter work. Group limited to 50. No fee. *Saturday mornings, 9–11:15, January 15 to February 26.*

III. Spring Course.—Nature study and preparation for the outdoor garden, including studies of seed germination, seed sowing in the greenhouse, and the making of garden plans. All candidates for the outdoor garden must be in spring classes. Enrollment limited to 200. *Fee, ten cents. Saturday mornings, 9–11:15, March 12 to April 9.*

IV. Outdoor Garden Course.—The outdoor garden is open throughout the summer season, and time is arranged to fit in with

children's vacation schedules. No child is assigned an outdoor garden who has not had the spring preparatory work. Group limited to 200 children. *Fee, twenty-five or thirty-five cents depending on the size of the garden.* The garden session begins *April 23.*

D. Course for Student Nurses

D1. General Botany with Special Reference to Medicinal Plants.—A course of 10 spring and 10 fall lectures, demonstrations, and field trips for student nurses. Arranged in cooperation with various hospitals. The general principles governing the life of plants, as well as the use and care of flowers and potted plants in the sick room, will be considered. Special attention will be paid to the outdoor identification of officinal plants. Hours to be arranged. *No fee.* Dr. Graves.

E. Investigation

1. *Graduate Work for University Credit*

By the terms of a cooperative agreement between New York University and the Brooklyn Botanic Garden, properly qualified graduate students may arrange to carry on independent investigations in botany at the Garden under the direction of members of the Garden Staff, who are also officers of instruction in the Graduate School of the University. The advantages of the library, laboratories, herbarium, and collections of living plants at the Garden are freely at the disposal of students registered at New York University for such work. Such properly enrolled graduate students are charged no additional fees by the Garden. The following courses are approved by the faculty of the Graduate School of New York University and are given credit as full courses:

E6. Research in Mycology and Plant Pathology.—Investigation of problems relating to fungi and fungous diseases of plants. Dr. Reed.

E8. Research in Forest Pathology.—Investigation of the diseases of woody plants. Dr. Graves

E9. Research in the Structure of Flowers. Dr. Gundersen.

E10. Research in the Systematic Botany of the Flowering Plants. Dr. Svenson.

2. Independent Investigation

The facilities of the laboratories, conservatories, library, and herbarium are available to qualified investigators who wish to carry on independent researches in their chosen field. There is a charge of $25 per year, payable to the Botanic Garden.

COOPERATION WITH LOCAL SCHOOLS

The Brooklyn Botanic Garden aims to cooperate in every practicable way with the public and private schools of Greater New York in all matters pertaining to the study of plants and closely related subjects. The purpose of the Garden in this connection is to supplement and enrich the school work in the way of instruction, demonstration methods, study material, etc., which otherwise would not be available.

Geography classes, as well as classes in nature study and botany, find the collection of useful plants in the Economic Plant House, the Local Flora Section, the Japanese Garden, and also the Meridian Panel, the Armillary Sphere, and the Labeled Boulders, valuable adjuncts to their class work. Arrangements may be made by teachers of geography to have their classes study these collections under guidance. Illustrated lectures for geography classes may also be arranged for at the Garden.

To visiting college classes in geology and physiography the Botanic Garden offers interesting material for a study of glaciation. Notable features are a portion of the Harbor Hill terminal moraine (Boulder Hill), the morainal pond (the "Lake"), the labelled glacial boulders, and the Flatbush outwash plain. See Guide No. 7, *"The Story of our Boulders: Glacial Geology of the Brooklyn Botanic Garden."*

Talks at Elementary Schools.—The principals of public or private elementary schools may arrange to have talks given at the schools on various topics related to plant life, such as school gardens and garden work with children, tree planting, the conservation

of wild flowers, Arbor Day, etc. If an illustrated lecture is desired, the lantern and operator must be provided by the school, but slides will be furnished by the Botanic Garden. Address the *Curator of Elementary Instruction* for a list of talks and for appointments.

Talks at Secondary Schools and Colleges.—Informal illustrated talks on various subjects of an advanced botanical nature are always gladly given at Secondary Schools and Colleges by members of the staff. Arrangements for such talks should be made with the *Curator of Public Instruction.*

School Classes at the Garden.—(*a*) Public or private schools may arrange for classes, accompanied by their teachers, to come to the Botanic Garden for illustrated lectures either by the teacher or by a member of the Garden Staff.

(*b*) Notice of such a visit should be sent at least *one week* previous to the date on which a talk is desired. Blank forms are provided by the Garden for this purpose. These talks will be illustrated by lantern slides, and by the conservatory collection of useful plants from the tropics and subtropics. Fall and spring announcements of topics will be issued during 1937–38.

(*c*) The Garden equipment, including plant material, lecture rooms, lantern, and slides, is at the disposal of teachers who desire to instruct their own classes at the Garden. Arrangements must be made in advance so that such work will not conflict with other classes and lectures. For High School and College classes address the *Curator of Public Instruction.* For Junior High and Elementary School classes address the *Curator of Elementary Instruction.*

(*d*) The principal of any elementary or high school in Brooklyn may arrange also for a series of six lessons on plant culture to be given to a class during the fall or spring. A small fee is charged to cover the cost of the materials used. The plants raised become the property of the pupils. The lessons are adapted for pupils above the third grade.

Special classes for the blind may be arranged. A week's notice is asked so that plant material in sufficient amount may be ready.

Seeds for School and Home Planting.—Penny packets of seeds are put up by the Botanic Garden for children's use. In the early spring, lists of these seeds, order blanks for teachers and pupils, and other information may be secured on application to the *Curator of Elementary Instruction.*

Demonstration Experiments.—Teachers may arrange to have various physiological experiments or demonstrations conducted at the Garden for the benefit of their classes. Communications in regard to these matters should be addressed to the *Curator of Public Instruction.*

Loan Sets of Lantern Slides.—Sets of lantern slides have been prepared for loan to the schools. Each set is accompanied by a short lecture text of explanatory nature. In all cases these sets must be called for by a responsible school messenger and returned promptly in good condition. Address, by mail or telephone, Mr. Frank Stoll. The subjects now available are as follows. Other sets are in preparation.

1. Plant Life
2. Spring Wild Flowers
3. Common Trees
4. Fall Wild Flowers
5. Forestry
6. Conservation of Native Plants

Study and Loan Material for Elementary Schools.—To the extent of its facilities, the Botanic Garden will provide, on request, various plants and materials for nature study. As far as possible this material will continue to be supplied gratis to elementary schools in case one or more of their teachers are members of regular Botanic Garden classes. Requests should be made to Miss Elsie T. Hammond, and material should be called for at the Information Booth on the ground floor.

Study and Loan Material for High Schools, Junior High Schools, and Colleges

Available at the Brooklyn Botanic Garden, 1937–1938

The Botanic Garden is able to supply various plants and plant parts for study; certain protozoa; sterilized nutrient agar; and also material and mounts for exhibit purposes. When containers are

necessary, as in the case of agar, algae, and protozoa, they must be furnished by the school.

In the past, the Garden has offered this service gratis, but both on account of the increasing demand and because of the decrease in appropriations, it has become necessary to make a small charge for the material supplied or loaned. A Price List of the various materials furnished will be mailed on request.

Requests should be made by mail or telephone (PRospect 9–6173), at least one day in advance, to Dr. Elizabeth Marcy, and the material should be called for at Room 204. All exhibit material, and other items starred (*) will be mailed if the schools pay postage.

LIVING MATERIAL—PLANTS

Algae: 1. Spirogyra, *Pleurococcus, Oedogonium, Vaucheria, Hydrodictyon, Desmids, Oscillatoria, Scenedesmus. 2. *Spirogyra conjugating—preserved material.

Bacteria: 3. *Slant cultures of Azotobacter, *B. coli, B. subtilis, Pseudomonas radicicola, Sarcina flava, Serratia marcesans, Chromobacterium violaceum.*

Fungi: Plus and minus strains of bread mold (*Rhizopus nigricans*). 4. *Spores for inoculation. 5. Cultures of each strain. (Molds should be grown on potato dextrose agar.) 6. Petri dish inoculated with both strains showing lines of zygospores.

Liverworts:

Thallus only—7. Marchantia. 8. Conocephalum.

Thallus with gemmae cups—9. Marchantia. 10. Lunularia.

Mosses: 11. Protonema. 12. Felt. 13. Felt with capsules.

Fern Allies: 14. Selaginella plants.

Ferns: 15. Prothallia. 16. Small ferns showing rhizome and roots. 17. Fern fronds with spores—various species.

Gymnosperms: 18. *Pine seeds. 19. *Cones. 20. Twigs showing needle arrangement—various evergreens.

Angiosperms:

Plants: For photosynthesis experiments: 21. Coleus. 22. Tradescantia. Geranium, 23. green, 24. silver. With fleshy leaves: 25. Bryophyllum. 26. Sedum. Insectivorous: 27. Sundew.

Water: 28. Elodea. 29. Duckweed.
Sensitive: 30. *Mimosa pudica.*

Leaves: 31. Sedum, Sansevieria, Coffee, and others.
For plant propagation. 32. Bryophyllum.

Stems: 33. *Twigs to show opposite and alternate leaf-arrangement, thorns, terminal buds, etc., 9–12″. 34. *Corn or sorghum stems dried.

Cuttings: (Unrooted or rooted). 35. Tradescantia. 36. Begonia. 37. Geranium. 38. Coleus.

39. Seeds:

* For germination studies: Castor bean, corn, garden beans, lupine, peas, squash.
* For study of root hairs: Oats, radish, sorghum, wheat.

40. Seedlings in paper cups—any of preceding (No. 39).
41. Terrarium material when available.

Material for the study of genetics:

42. *Sorghum seeds giving F_2 seedlings showing Mendelian ratios:
Red and green seedling color (3:1)—seeds for parents and F_2.
Normal and albino seedlings—lethal factor (3: 1).
Dihybrid ratio—red, green, normal, albino.
43. *Pea seeds of tall and dwarf strains.
44. Seedlings of any of the above.
45. Drosophila—wild type, white, sepia, vestigial.

LIVING MATERIAL—ANIMALS

Protozoa (cultures not pure but desired form predominates):
46. Cultures of Amoeba, Actinosphaerium, Blepharisma, Paramoecium bursaria, Spirostomum, Vorticella, Stentor.
47. Cultures of Paramoecia, Euglena.
48. Mixed cultures of Protozoa.

Other animal material: 49. Daphnia. 50. Drosophila. 51. Hydra.

STERILIZED AGAR

52. Petri dishes, test tubes, or flasks, sent in clean and dry, one week in advance will be filled with sterile nutrient agar, or with potato dextrose agar for the study of bacteria and molds.

SPECIMENS AND MOUNTS FOR EXHIBIT

Illustrating the principles of genetics:

Pea seeds illustrating a dihybrid ratio (wrinkled, smooth, yellow, green). 53. In vials. 54. Riker mount.

55. Jimson weed (*Datura*)—mount to show F_2 segregation of spiny and smooth pods.

Corn showing monohybrid and dihybrid ratios:

56. Ears of parents and F_2—seed of F_1 in vial—unmounted.

57. Same mounted in glass covered display case.

58. F_2 ears in glass tubes—for counting kernels.

59. Sorghum—Hybrid vigor—Riker mount of parents and F_1.

60. Sorghum—Inheritance of seed color—Riker mount.

61. Oats—Mendelian inheritance of hull color—Riker mount.

62. Snapdragon—Inheritance of flower color—Riker mount.

Economic plants:

63. Bundles of cereal grains (barley, oats, rice, rye, sorghum, wheat).

64. Test tubes of cereal grains—threshed.

65. Types of cereal grains—Riker mount.

66. Types of wheat—Riker mount.

Fungi and plant diseases:

Bracket fungi: 67. Unmounted.

68. Mounted in cardboard boxes with cellophane covering.

Leaves showing leaf spot diseases (rusts, mildews, and others).

69. Unmounted. 70. Mounts covered with cellophane.

71. Riker mount—specimens of six diseases.

Smut of oats or wheat, or ergot of rye.

72. Unmounted. 73. Displayed in test tubes.

Mosses and Ferns: Mounts covered with cellophane.

74. Life history of a moss plant—*Polytrichum commune.*

Lycopodium plants with sporophylls—75. Unmounted. 76. Mounted.

77. Small fern showing rhizome, roots, buds, leaves—mounted.

78. Fertile and sterile fronds—various fern species—mounted.

Angiosperms:

Pressed leaves—79. Loose. 80. Mounts covered with cellophane.

81. Riker mount of 12 leaves showing different types.
82. Riker mount showing leaf modifications.

Fruits of trees, flowering plants, weeds, lotus pods—83. Loose.

84. Riker mount to show methods of seed dispersal.

BUREAU OF PUBLIC INFORMATION

Consultation and advice, and the facilities of the library and herbarium are freely at the service of members of the Botanic Garden and (to a limited extent) of others with special problems relating to plants or plant products, especially in the following subjects:

1. Plant diseases and determination (naming) of fungi.
2. Plant geography and ecology.
3. Determination of flowering plants.
4. The growing of cultivated plants and their arrangement; also their adaptation to soils, climate, and other factors.
5. The care of trees, shrubs, and lawns, and general gardening problems.

Inquiries should be directed to the *Curator of Public Instruction,* preferably by letter.

Determination of Specimens.—If the identification of plants is desired, the material submitted should include flowers, and fruit when obtainable. Identification of a single leaf is often impossible. For identification of plant diseases, representative portions of the part diseased should be sent.

DOCENTRY

To assist members and others in studying the collections, the services of a docent may be obtained. Arrangements should be made by application to the *Curator of Public Instruction* one week in advance. No parties of less than six adults will be conducted. This service is free of charge to members; to others there is a charge of 50 cents per person. For information concerning membership in the Botanic Garden see pages i–iii of this PROSPECTUS.

MEETINGS OF OUTSIDE ORGANIZATIONS

The Brooklyn Botanic Garden is glad to welcome outside organizations wishing to hold meetings at the Garden, provided the general purpose of the organization is closely allied to that of the Botanic Garden (e.g., Botanical Groups, Garden Clubs, Nature Study Clubs, Conservation organizations, etc.), or that the specific purpose of the meeting is of mutual interest and advantage to the organization and the Botanic Garden. Meetings must always be arranged for in advance. A folder giving full details, and an application blank may be had by addressing *The Custodian*.

INDEX TO VOLUME XXVI

A. A. A. S., Annual Meeting of the, 69
Adult Courses, 65
American Narcissus Growers Association, 36
American Philosophical Society, 40
Attendance, 13
  Garden, 62, 64

Balaban-Gordon Company, 18
Bartlett, F. A., 57
Benedict, Ralph C., 98
Bennett, Helen E., 34
Bequest and Gifts, 35
  to the Brooklyn Botanic Garden, Forms of, Preceding p. 11
Bird Lovers Club of Brooklyn, 68
Botanic Gardens of the World: Materials for a History, 149
Botanical Society of America, 32
Bowman, Inc., Arthur, 36
Brandwein, Paul F., 47
Broadcasting, 22
Brooklyn Botanic Garden Publications, 1936, Report on, 131
  College, 31
  Museum, 30
Buhle, Louis, 78
Bureau of Information, 69
Butler Cup, 72

Cary, Mrs. William H. Cary, 99
Cedar Hill Nursery, 76
Cheney, Ralph H., 62, 99
Chestnut Breeding Work in 1936, 47
Children's Garden, 72
  Work, Special Gifts for, 106
Chinese Chestnut, Disease Resistance of the, 54
Ching, R. C., 56
City, The Botanic Garden and the, Preceding p. 11
Clark, Beatrice, 34, 71
Classes, 78
Cocos Island, 61, 62
Coffee and Tobacco Pharmacology, 62
Conifers, 77
Conklin, Marie E., 47
Conservatories, 18, 82
  Attendance at, 64
Contributions and Memoirs, 132
Cooperation, 67, 85
  with Federal Government Agencies, 25
  Other Organizations, 27
Cornell, Grace, 99
Courses, New, 67
Cryptogams, Ravine for, 77

Delectus Seminum, Brooklyn 1936, 1
De Mario, J. J., 57
Department of Botany, 67
  Health, 27
  Parks, 29
Dicotyledons, The Classification of, 60
Director, Report of the, 11
Doney, Charles F., 34
Dorward, Margaret M., 33, 71
Downer, Henry E., 67

Ecology, 131
Education, Elementary, 23
  Public, 21
Elementary Instruction, Report of the Curator of, 71
Elcocharis, 62
Ellis Island, 85
Endothia parasitica, 47
Endowment Fund, Children's, 106
Eriophorum Cape, 36
Exhibits, 69, 78, 84, 91
Extra Mural Activities, 23

Fahnestock, Gates D., 33
Fairchild, Paul H., 57
Farmingdale Iris Garden, 45
Fern Work, 98
Field Secretary for 1936, Report of the, 99
  Trips Conducted, 1936, 129
Fiji Islands, 62
Financial, 37
  Statement for 1936, 102
Flower Days, 67
  Show, International, 31
Forest Pathology, 47
Free, Montague, 67, 85
Frishmuth, Harriet, 15

Frothingham Bequest, 35

Gager, C. Stuart, 6, 39
Gailer, Evelyn M., 34
Galapagos Island, 61
Genetics, 132
Gentians, Water Colors of, 91
Gifts Received During 1936, 105
Graduate Students and Independent Investigators Enrolled During 1936, 47
Graves, Arthur Harmount, 47, 71
Greenhouses, the educational, 73
Gronen, Hamilton F., 36
Gundersen, Alfred, 60, 80

Hamden, Connecticut, Chestnut Species, Varieties, and Hybrids Growing at, 57
Hatton, R. Marion, 67
Health, Department of, 65
Heissenbuttel, Hazel, 99
Herbarium, 24
  Accessions and Distribution, 88
  for 1936, Report of the Curator of the, 86
Hitchings and Company, 18
Horticultural Section, 17, 81
Horticulturist for 1936, Report of the, 81

International Flower Show, 84
Iris, 45
  Collections, 79
  Japanese, 80
  Soft Rot of the Rhizome, 45

Jansson, Gustav S., 34
Japanese Garden, 16
Jennison, H. M., 52
Jewish Hospital, 68
Jordan, William E., 33, 95
Junior Garden Conference, 72

Knapp, H. B., 44

Labels, 78
  and Signs, 80
Lawton, Elva, 47
Leaflets, 22, 132
Library, 25, 106
  for 1936, Report on the, 92
  Statistical Report on the, 95
Lilac Area, 82
Lilacs, 76
Limpus, Anne, 73
Lincoln, Mrs. Roy M., 99
Loans, Interlibrary, 94
Local Flora Section, 17, 87
Lu-Shan Arboretum and Botanical Garden, 56

Marcy, D. Elizabeth, 43, 65
Marshall, Helen, 73
Masterson, Philip, 34
Medicinal and Culinary Plant Garden, 17
  Garden, 84
Members, List of, 136
Membership, 35
  Information Concerning, Preceding p. 11
  Privileges of, Preceding p. 11
  Out-of-Town, Preceding p. 11
  Summary of, 148
Memoirs, Contributions and, 132
Merchants Association, 32
Merrill, Gertrude W., 101
Meurlin, Marion L., 34, 65
Miller, E. S., 86
Mutation in Nature, 59

Narcissus Bulbs, 36
National Research Council, 49
Needs, 37
Nephrolepis, 98

Oat Smuts, 40, 41
Organization Meetings at the Garden, 1936, 130

Penrose Fund, 40
Personnel, 32, 81
Photographic Work, Report on, 131
Plantations, 12
Plants for 1936, Report of the Curator of, 76
  Statistics Relating to Living, 79
Police Department, 29
Postcards to Members, 71
Private Funds, Tax Budget and, 37
Prospectus: 1937–38, 00
Publications by the Botanic Garden Personnel During 1936, 113
Public Instruction, Report of the Curator of, 62
Publicity, Editorial Work and, 69
Purdy, Maud H., 91
Putnam, William A., 32
PWA, 25

Radio Garden Club Field Day, 68
  Talks, 71
    by the Botanic Garden Personnel During 1936, 127

Rausch, Mr., 57
Ravine for Cryptogams, 77
Record, Brooklyn Botanic Garden, 132
Reed, George M., 33, 39, 45, 79
Reimer, Rudolph, 85
Report of the Brooklyn Botanic Garden, 1936, Twenty-Sixth Annual, 11
Research, 18
for 1936, Reports on, 39
Resident Investigator (Economic Plants) for 1936, Report of the, 99
(Ferns) for 1936, Report of the, 97
Revillagigedo Island, 61
Rose Arc, 13, 36, 82
Garden, 15, 82

School Service, Statistics of, 66
Supply Service, 65
Seed Exchange, 78
International, 84
Seed Lists, Botanical Institutions Outside of Europe from Which We Have Received, 7
Seeds Offered in Exchange, List of, 1
Shaw, Ellen Eddy, 76
Signs, Labels and, 80
Smith, Floyd F., 46
Sorghum Smut Investigations, 43
Stanton, T. R., 40
State Institute of Applied Agriculture on Long Island, 31, 44
Storrs, Mrs. Belle, 36
Study material, 73
Stumpp and Walter Company, 36
Svenson, Henry K., 61, 91
Swanley Horticultural College, 71
Systematic Botany, 60, 61
Section, 81

Talks, Lectures, Addresses, and Papers Given by the Botanic Garden Personnel During 1936, 119
Tax Budget and Private Funds, 37
Thatcher, John and Son, 15
Thrips Control, Iris, 46
Tobacco Pharmacology, Coffee and, 62
Trees, 77
Trustees, Officers of the Board of, 133

United States Botanic Garden, 27
Utter, L. Gordon, 41

Weigel, C. A., 46
White, Alfred T., 19
Woman's Auxiliary, 34, 36, 100, 134
Works Progress Administration, 26
WPA, 25

Yale University School of Forestry, 68

BROOKLYN BOTANIC GARDEN

RECORD

EDITED BY

C. STUART GAGER

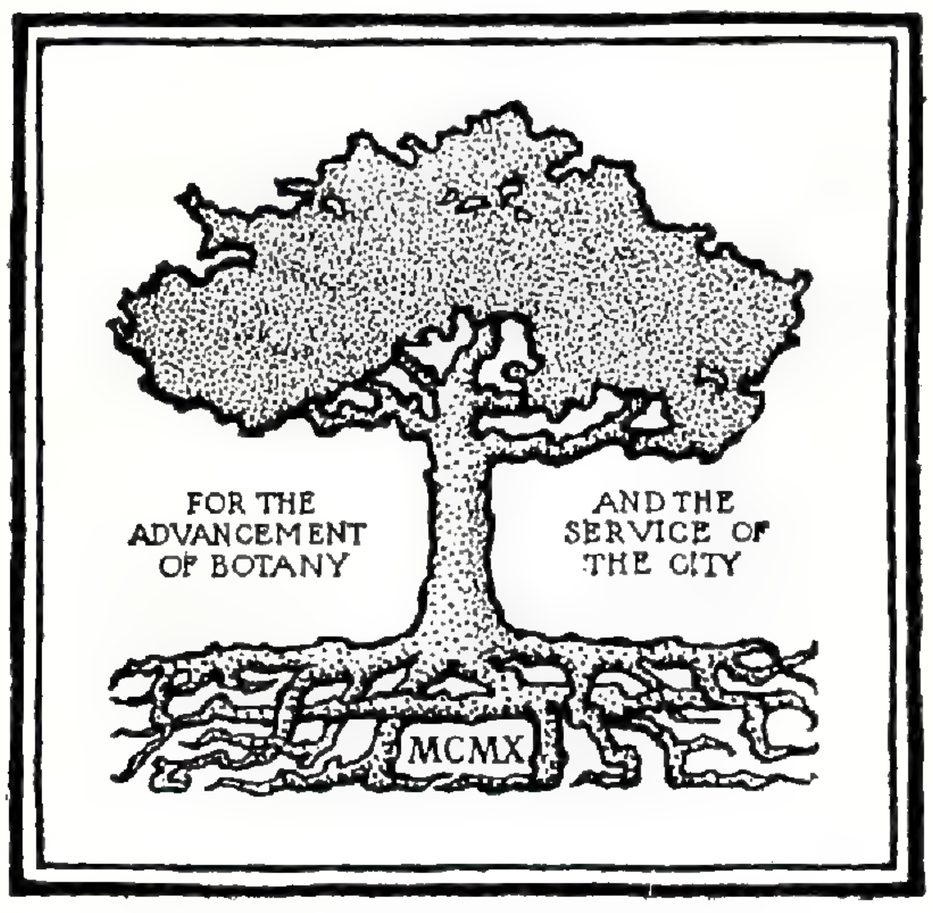

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TABLE OF CONTENTS OF VOLUME XXVI

No. 1, January

Delectus Seminum, Brooklyn 1936 (List of Seeds Offered in Exchange) 1

No. 2, April

The Botanic Garden and the City ..... Preceding page 11
Information Concerning Membership ..... Preceding page 11
Privileges of Membership ..... Preceding page 11
Forms of Bequest to the Brooklyn Botanic Garden .... Preceding page 11
Out-of-Town Membership Privileges ..... Preceding page 11
Twenty-Sixth Annual Report of the Brooklyn Botanic Garden, 1936 ... 11
Report of the Director 11
Reports on Research for 1936 39
Report of the Curator of Public Instruction 62
Report of the Curator of Elementary Instruction 71
Report of the Curator of Plants 76
Report of the Horticulturist 81
Report of the Curator of the Herbarium 86
Report on the Library 92
Statistical Report on the Library 95
Report of the Resident Investigator (Ferns) 97
Report of the Resident Investigator (Economic Plants) 99
Report of the Field Secretary 99
Financial Statement for 1936 102
1. Tax Budget Accounts 102
2. Private Funds Accounts 103
3. Summary of Total Maintenance Budget for 1936 104
Gifts Received During 1936 105
Publications by the Botanic Garden Personnel During 1936 113
Talks, Lectures, Addresses, and Papers Given During 1936 119
Radio Talks by the Botanic Garden Personnel During 1936 127
Field Trips Conducted 129
Organization Meetings at the Garden, 1936 130
Report of Photographic Work 131
Officers of the Board of Trustees 133
Members of the Board 133
Woman's Auxiliary 134
List of Members 136
Summary of Membership 148

No. 3, July

Botanic Gardens of the World: Materials for a History 149

No. 4, October

Prospectus: 1937–38 355
Information Concerning Membership i
Privileges of Membership ii
Out-of-Town Membership Privileges iii
Regulations Concerning Photographing, Painting, and Sketching .. iv
Courses of Instruction 355
Cooperation with Local Schools 365
Bureau of Public Information 371
Docentry 371
Meeting of Outside Organizations 372

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GENERAL INFORMATION

Membership.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, N. Y.* Telephone, Prospect 9–6173.

The Botanic Garden is open free to the public daily from 8 a.m. until dusk; on Sundays and Holidays it is open at 10 a.m.

Entrances.—On Flatbush Avenue, near Empire Boulevard and near Mt. Prospect Reservoir; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Crown Street.

To Assist Members and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden;* to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one day in advance. No parties of less than six adults will be conducted.

To Reach the Garden take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, or Tompkins Avenue trolley to Washington Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street or Vanderbilt Avenue trolley to Prospect Park Plaza and Union Street. By Automobile from points on Long Island take Eastern Parkway west and turn left at Washington Avenue; from Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway, turn left following Parkway to Washington Avenue; then turn right.

BROOKLYN BOTANIC GARDEN
PUBLICATIONS

RECORD. Established, January, 1912. An administrative periodical issued quarterly (1912–1928); bimonthly (1929–1932); quarterly (1933–). Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, announcements of courses of instruction, seed list, guides, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden. To others $1.00 a year. Circulates in 59 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Circulates in 47 countries.

Volume I. *Dedication Papers:* comprising 33 scientific papers presented at the dedication of the laboratory building and plant houses, April 19–21, 1917. 521 pages. Price $3.50, plus postage.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk: A study of grassland and forest. By Norman Taylor, June 11, 1923. 108 pages. Price $1.00, plus postage.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor, June 10, 1927. 151 pages. Price $1.60.

CONTRIBUTIONS. Established, April 1, 1911. Papers originally published in periodicals, reissued as "separates" without change of paging, and numbered consecutively. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume. Circulates in 34 countries.

No. 73. Studies of the root nodule organisms of certain wild legumes. 19 pages. 1936.

No. 74. The effects of radium rays on plants: Résumé of the more important papers from 1901 to 1932. 27 pages. 1936.

No. 75. Inheritance of resistance to the loose and covered kernel smuts of Sorghum: I. Dwarf Yellow Milo hybrids. 20 pages. 1937.

No. 76. Inheritance of resistance to the loose and covered kernel smuts of Sorghum: II. Feterita hybrids. 23 pages. 1937.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. The purpose of the *Leaflets* is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries. Temporarily discontinued, 1936–37.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication. Issued as numbers of the RECORD; see above.

Guide No. 5. The Rock Garden. 28 illustrations. Price, 35 cents. By mail, 40 cents.

Guide No. 6. Japanese potted trees (Hachinoki). 11 illustrations. Price, 35 cents. By mail, 40 cents.

Guide No. 7. The story of our boulders: Glacial geology of the Brooklyn Botanic Garden. 22 illustrations. Price, 35 cents. By mail, 40 cents.

Guide No. 8. The story of fossil plants. 8 illustrations. Price, 35 cents. By mail, 40 cents.

SEED LIST. (*Delectus Seminum*) Established, December, 1914. Since 1925 issued each year in the January number of the RECORD. Circulation includes 160 botanic gardens and institutions located in 40 countries.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $4.00 a year. Circulates in 48 countries.

GENETICS. Established, January, 1916. Bimonthly. Subscription, $6.00 a year. Circulates in 37 countries.